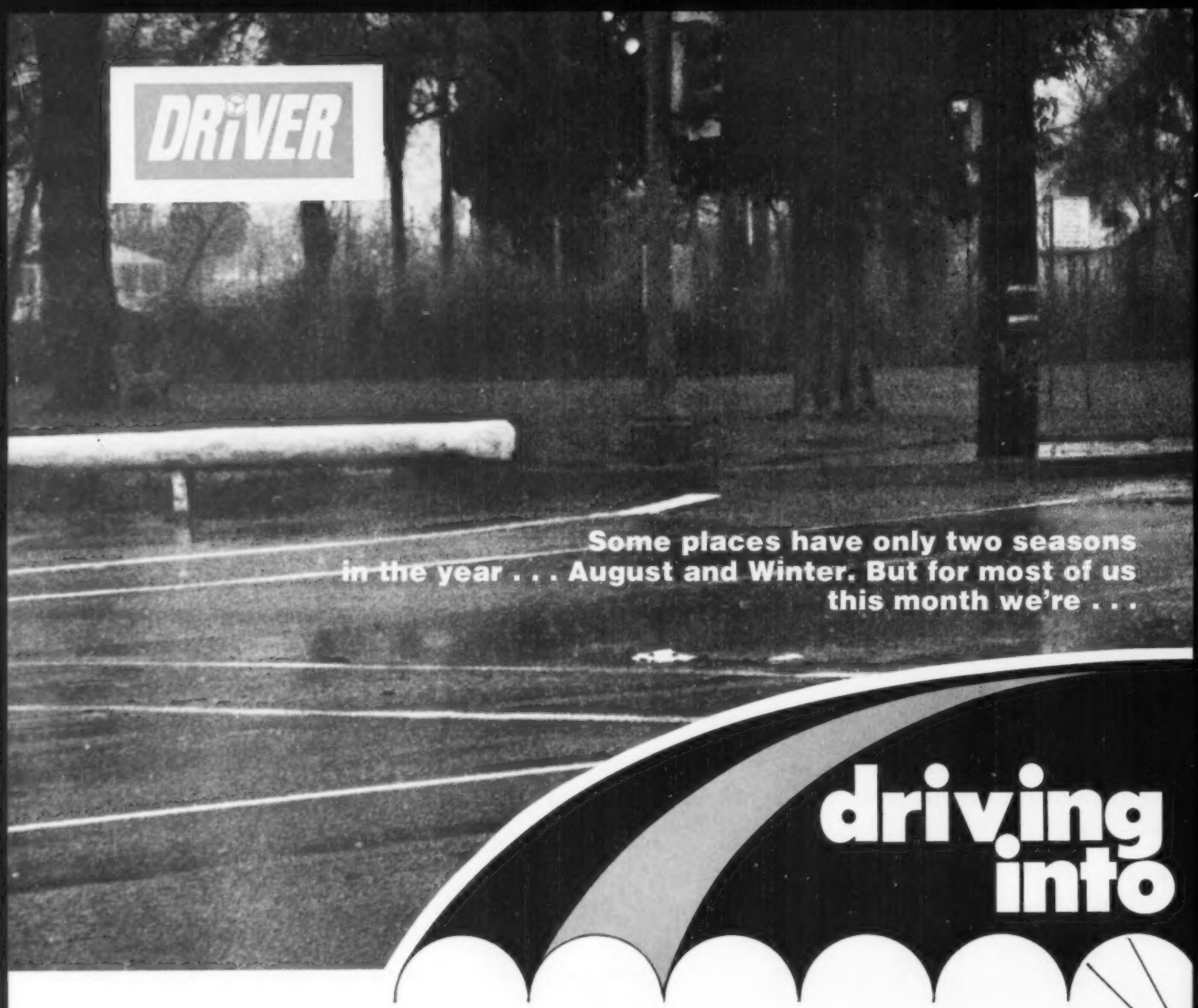
MARCH 1982

DRIVER

driving into spring



Some places have only two seasons in the year . . . August and Winter. But for most of us this month we're . . .

driving into

(above)
Water this deep acts as a brake, and if you hit it fast it can turn you in a new direction.

We drivers have very little choice about preparing our cars for winter. If we don't worry about batteries and snow tires and the mix in the radiator, then one miserable day our car's not going to take us where we have to go. So — even if we're lazy and broke — we do winterize our vehicles.

But now it's spring. An easy time to put maintenance off, but once again the car needs our attention. Because spring means rain, maybe even a very slushy late snow. Some of the worst accidents occur in mild temperatures on pavements that are simply very wet. If the car's in poor condition, minor driving errors can get us in major trouble!

Start clean: The first thing we suggest is a thorough wash job. A car really should be washed frequently all winter long, to remove ice and snow buildup under the fenders and under-carriage. Even if that's all melted away by now, there may be plenty of dried mud in the wheel wells, and a heavy build-up can affect steering and ride. The high-pressure spray at the car wash can remove that dirt. It will also do a good job on the salt which is definitely on your car if you live in an area where salt is used to melt road ice. Salt is extremely

SPRING

damaging. Some car washes on the East Coast have special equipment to remove salt and that's a really good idea.

If you want to wash the car yourself, just remember to use a mild dishwashing soap (laundry detergents may have high alkalai content, which is bad for the paint), and then wipe the finish with a damp chamois or towel because a dry one can scratch the paint.

After the car is clean and dry, inspect it for scratches. You can dab them with car wax to stop rust from forming, but it's better to fill the scratch with touch-up paint. Just touch the paint on and let it run and spread into the scratch for even coverage. Never paint over rust. If a spot has rusted, rub it out with steel wool first. Very fine steel wool also works well on rusted chrome.

Moving on ... Salt is really bad news, not just because it causes rust spots on your fenders but because it also does a number on hoses, fanbelts, and under-hood wiring. Look at your hoses and belts to see if they need replacing. Then check for rust holes in the exhaust system. Mufflers and tailpipes take a real beating in winter.

While the car is up on a lift, check

continued

DRIVER

THE
TRAFFIC SAFETY MAGAZINE
FOR THE MILITARY DRIVER

DEPARTMENT OF THE AIR FORCE
HQ AIR FORCE INSPECTION AND SAFETY CENTER
Norton Air Force Base, California 92409

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MAR

VOLUME 15 NUMBER 10

CONTENTS

Features

Driving Into Spring **1**

Conspicuous Controversy **6**

Ask For It **8**

State Legislative Status Report **12**

Jump Starts **13**

In The Valley of the . . . **14**

Slipsliding Away **16**

Less Is More **19**

The Backyard Mechanic Volumes **Back Cover**

Departments

Double Tech **20**

The Backyard Mechanic **22**

Timely Topics **27**

Backfire **28**

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the gas tank. Gas tanks tend to rust from the inside out, but this is a good time to poke around looking for signs of rust or weakness. A sound tank should be dry and dirty. If it appears clean or oily, or if the undercoating looks soft and shiny, there's a good chance a leak has developed.

Treat any suspected gas leak with respect. Gasoline is dangerous! Unless there is just the right mix of air and gasoline vapor, the stuff won't even burn, as you know if you've ever flooded an engine. But gas vapor, which can form when your leaking gas is exposed to air, is flammable. The vapor can creep around until it finds an ignition source. Fire breaks out and races back to the source of the fumes — your car! Whenever you smell gasoline in or around the car, have the car checked immediately.

Next, two important items on your spring check: the windshield wipers and the washer if you have one. Wipers suffer most from the hot summer, which disintegrates the rubber. But if you've used them a lot on icy windshields the last few months, they may be shot by now. We're driving into a season of rain and mud and fog. Replace the blades if necessary and fill up the washer solution reservoir.

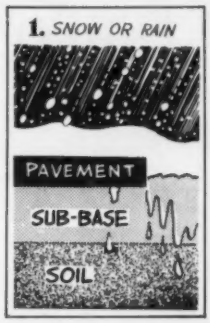
Winter also does no good for your front-end. Remember those roads with the bumpy covering of ice, or the roads with the crater-sized holes in the blacktop from freezing and thawing? If the front end is out of alignment, your tires will wear unevenly, and they'll wear out faster. A front-end alignment is much cheaper than a new pair of steel-belted radials.

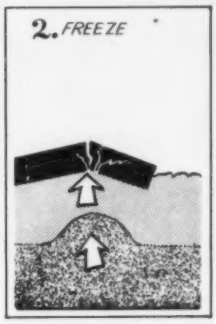
Tires: Next comes the tires. Check them for cuts, cracks, bulges, and TREAD. Every spring we remind you that the tire tread's main job is to provide traction on WET surfaces. On a dry surface you'd actually get better traction from a slick. The treads channel water out from under the tires and keep the car in touch with the pavement. When the treads can't do the job the entire weight of the car is supported by a thin film of water, and you're hydroplaning. Water pressure builds up under the tires and lifts them off the road. Sounds unlikely but it's absolutely true.

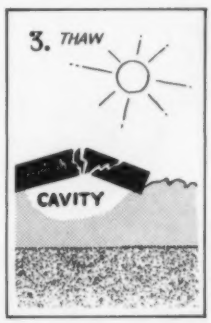
Try to avoid hitting a pothole if you can, but don't swerve into the path of other cars.

(right)
What causes potholes? (1) Rain, sleet or snow works its way into the soil under the pavement. (2) When the temperature drops, the water freezes and expands. This pushes up the soil and pavement. (3) As thawing occurs, the water runs away and the soil recedes, creating a hole under the pavement. (4) A passing car or truck breaks the pavement, causing the familiar pothole. Tires can be seriously damaged by striking a pothole.

(Tire Industry Safety Council, Washington, DC 20045)







The factors that determine if the car will hydroplane are auto speed, amount of water on the road, condition of tire tread, and air pressure in the tires. The more water and speed, and the less tread and pressure, the more likely you are to hydroplane.

You can be hydroplaning and not realize it until you try to pass another car. Then suddenly when you turn the wheel you're clear across the road and in the ditch, not even quite sure what happened. If you ever suspect you're hydroplaning, slow down. The tires will again make contact with the pavement.

Don't assume there has to be a lot of water on the road for hydroplaning to occur. If the surface water casts reflections from tires, telephone poles, or other cars, or if raindrops "dimple" the water's surface, you can be fairly certain hydroplaning

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TOYOTA

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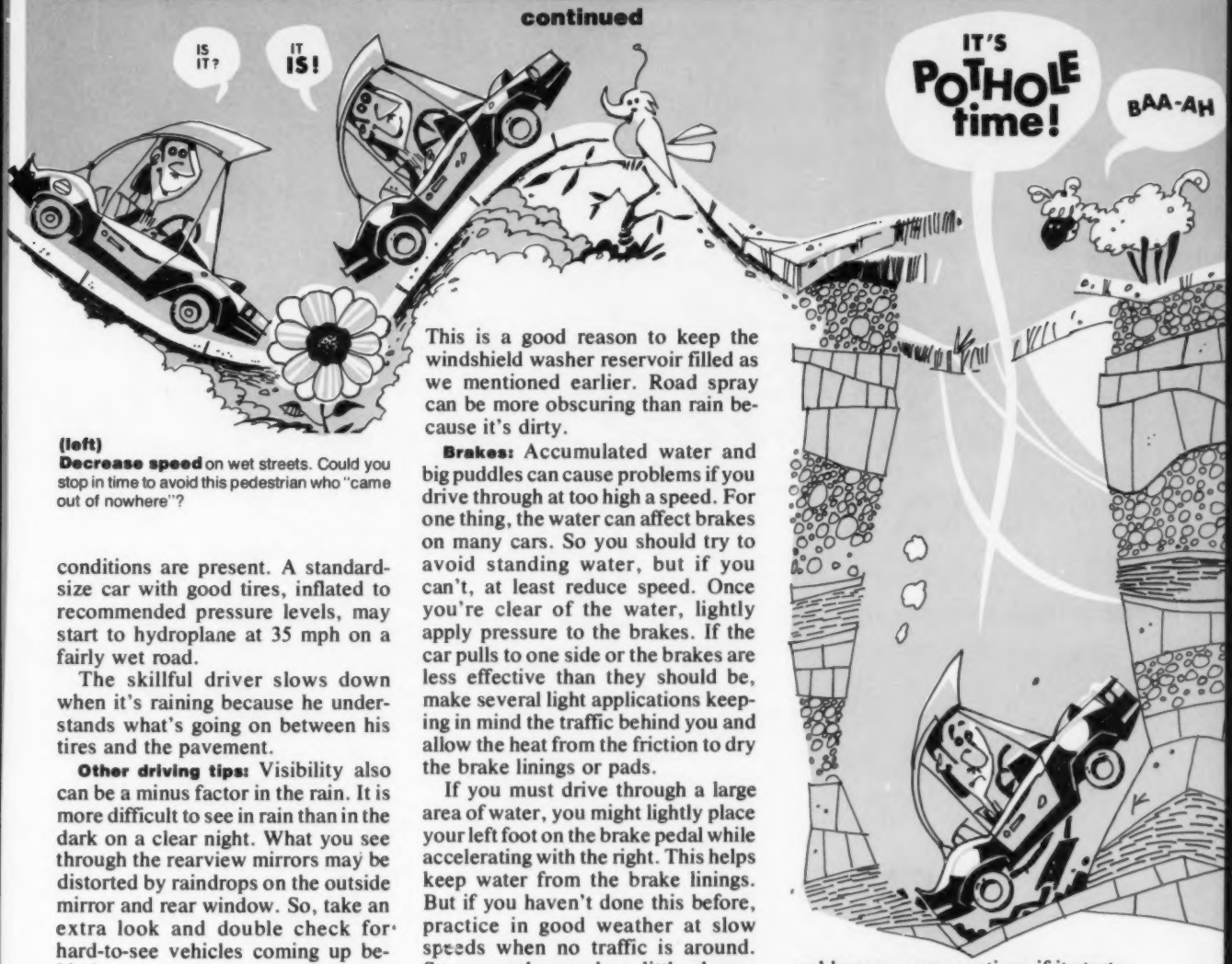

(left)
Decrease speed on wet streets. Could you stop in time to avoid this pedestrian who "came out of nowhere"?

conditions are present. A standard-size car with good tires, inflated to recommended pressure levels, may start to hydroplane at 35 mph on a fairly wet road.

The skillful driver slows down when it's raining because he understands what's going on between his tires and the pavement.

Other driving tips: Visibility also can be a minus factor in the rain. It is more difficult to see in rain than in the dark on a clear night. What you see through the rearview mirrors may be distorted by raindrops on the outside mirror and rear window. So, take an extra look and double check for hard-to-see vehicles coming up behind.

If you're having trouble seeing other traffic, they're having trouble seeing you. Turn on your lights. Drivers should take a tip from motorcyclists and think of their lights as a means of attracting attention to themselves. Use your headlights, never parking lights.

Even with wiper blades in good shape, a heavy rain can still partly obscure road sign and traffic signals, pavement markings, the edge of the road, even pedestrians. Be alert. Road spray from other cars can coat your windshield with a fine opaque coating, even after the storm is over.

(left)
Gloomy spring weather calls for headlights on, even if it's high noon.

This is a good reason to keep the windshield washer reservoir filled as we mentioned earlier. Road spray can be more obscuring than rain because it's dirty.

Brakes: Accumulated water and big puddles can cause problems if you drive through at too high a speed. For one thing, the water can affect brakes on many cars. So you should try to avoid standing water, but if you can't, at least reduce speed. Once you're clear of the water, lightly apply pressure to the brakes. If the car pulls to one side or the brakes are less effective than they should be, make several light applications keeping in mind the traffic behind you and allow the heat from the friction to dry the brake linings or pads.

If you must drive through a large area of water, you might lightly place your left foot on the brake pedal while accelerating with the right. This helps keep water from the brake linings. But if you haven't done this before, practice in good weather at slow speeds when no traffic is around. Some people may be a little clumsy the first time they try to do something with their left feet that they normally do with their right.

Slippery pavement: When the first drops begin to fall, the smart driver slows down because he knows almost immediately he will not be able to stop as fast or accelerate as crisply as he could on the dry road. When it rains after an extended dry period, the water mixes with dust and accumulated oil dripped from vehicles onto the road surfaces and forms a slippery mixture. The road can remain slippery until enough rain has fallen to wash away the mixture. How long this takes depends on how hard it rains and how much accumulation there is on the road. The point is, it's always wise to reduce speed and become very cautious if it starts to rain while you're driving. Just the fact that the surface is suddenly wet, and your reflexes are tuned for driving on dry pavement, should be enough warning to slow down.

Stuck in the mud: If a wheel on your car gets stuck in the mud (or snow or sand, for that matter), don't try to free it by racing the engine. The free-spinning wheel on the other end of the axle will turn at twice the speed shown on your speedometer if your vehicle has a conventional differential gear. As a result tremendous centrifugal force develops quickly and the tire can explode in a matter of seconds.

continued on page 26

CONSPICUOUS YOU US CONTROVERSY

by CMSgt DAVID P. CUSHING
438th Military Airlift Wing Safety Office
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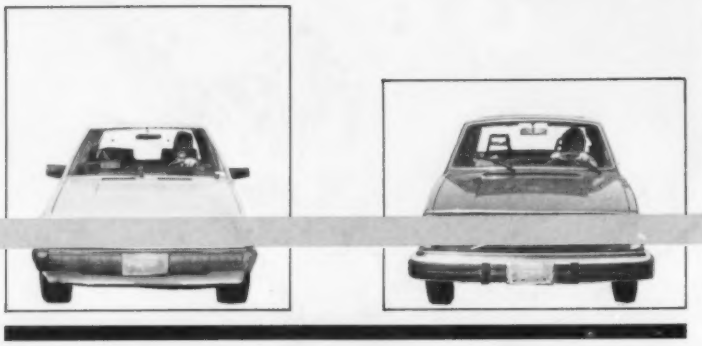


DRIVER Magazine's December 1981 "Backfire" contained a letter titled "Too Visible" from LTJG George R. Scott, U.S. Navy. Lieutenant Scott felt that a headlight modulator would be too conspicuous and used the example of the highway patrol vehicle with its flashing lightbar being known to draw a drunk to the vehicle resulting in a potentially fatal rear-ender.

I believe his theory has too many fallacies with regard to the application of a headlight modulator to a motorcycle headlight.

First of all, the motorcycle headlight modulates only during daylight hours. The only way a drunk would see the light would be when the drunk was approaching the cyclist somewhere between the positions of 10 and 2 of a clock face.

It is true that Harry Hurt's investigation of motorcycle accidents* pointed out that this was the area of most vulnerability for a motorcyclist, but it also is true that this is where the operator of the motorcycle should be looking and expecting problems to occur.

If the cyclist rides aware — aware of any possible incidents as taught in the Motorcycle Rider Course — he or she would use the IDPE** process and avoid this confrontation.

There may not be any statistics at the present time to prove or disprove either of our theories, but the value of the modulating headlight has proven itself to me over the past two years. I started using the "Q-Switch" in May 1980. Shortly after installation I traveled 7,000 miles around the USA for a period of 30 days on two wheels. I noticed the difference it made almost immediately.

On that trip alone, it kept at least four car drivers from pulling out in front of me from side streets and sent another driver approaching me on my side of the road, around a sweeping curve, back to his side of the highway.

How do I know the four cars would have pulled out?

Every one of them had stopped and almost immediately started again when they caught my light out of the corner of their eyes. They reacted by slamming on their brakes and that left me with most of the lane to avoid them. If they had not stopped, I would have had to practice my accident-avoidance countermeasures.

By riding aware, you will anticipate that every vehicle will violate your right-of-way and will eventually recognize which ones will definitely do it.

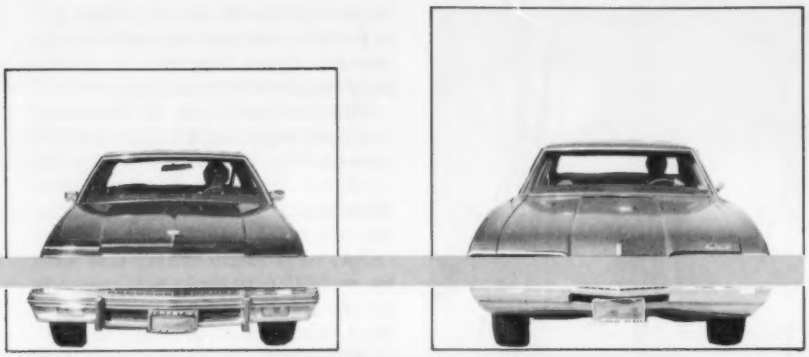
The four cycles per second that the headlight modulates gets the attention of other drivers. It does not alarm them, but it registers in their mind that a vehicle is there. The chance of them looking at you coming with your headlight on, but not really seeing you, is greatly reduced.

The value of the headlight modulator can be verified by others. So

---

** Dr. Hugh H. Hurt Jr. (known affectionately as "H3" to some of us, "Harry" to most of us) is a Professor of Safety at the University of Southern California and co-author of the Motorcycle Accident Cause Factors and Identification of Countermeasures report published by the Department of Transportation.*

*** IPDE: Identify, Predict, Decide and Execute.*



much so that Harley-Davidson has petitioned the Department of Transportation to make it available as an option on all motorcycles.

At the present time some state motor vehicle bureaus do not allow the use of the headlight modulator.

The question remains that if the modulating headlight becomes a standard motorcycle item, will it be effective then?

I am inclined to see the extra safety margin disappear because the auto driver would become used to it, know it is a motorcycle, and pull out in front of the cycle rider.

A lot of education needs to be done, training too, for automobile drivers so they can more accurately distinguish just how far away a motorcyclist is from an intersection. Then the car driver can pull out at the proper time without cutting off the cyclist's right-of-way.

My theory is there are too many auto drivers who are not familiar with motorcycles and cannot properly judge motorcycle speed, therefore they pull out in front of the cyclist.

More education is needed for the cyclist so he/she can expect such a maneuver, plan escape routes quickly, and know what evasive maneuver to use. Education and experience — there are no other substitutes.

Means of making motorcycles more conspicuous

Motorcycle accident data suggest that motorcycle-car accidents often occur because the car driver does not perceive the moving motorcycle soon enough. A study was conducted by the University of Michigan Highway Safety Research Institute to develop and evaluate various means of making motorcycles more conspicuous.

More than 30 conspicuity treatments were developed, and the most promising ones evaluated in day and night tests involving ordinary car drivers on public roads. The tests established which conspicuity treatments effectively stopped motorists from violating the cyclist's right-of-way.

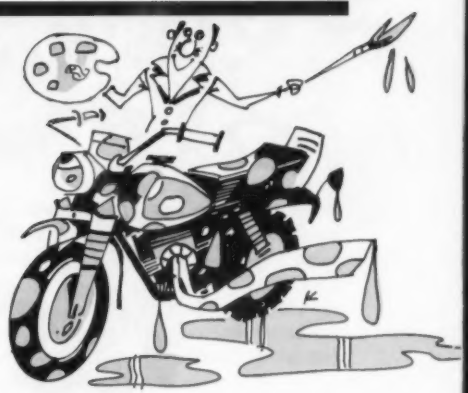
Findings showed that daytime conspicuity of a motorcycle is significantly improved if:

- **its normal low-beam headlight is turned on; or**
- **its high-beam headlamp is turned on and is modulating in intensity three times per second; or**
- **the motorcyclist is wearing a high-visibility (fluorescent) vest and helmet cover.**

Nighttime conspicuity is significantly improved when the motorcycle uses additional running lights or the cyclist is wearing a retroreflective vest and helmet cover.

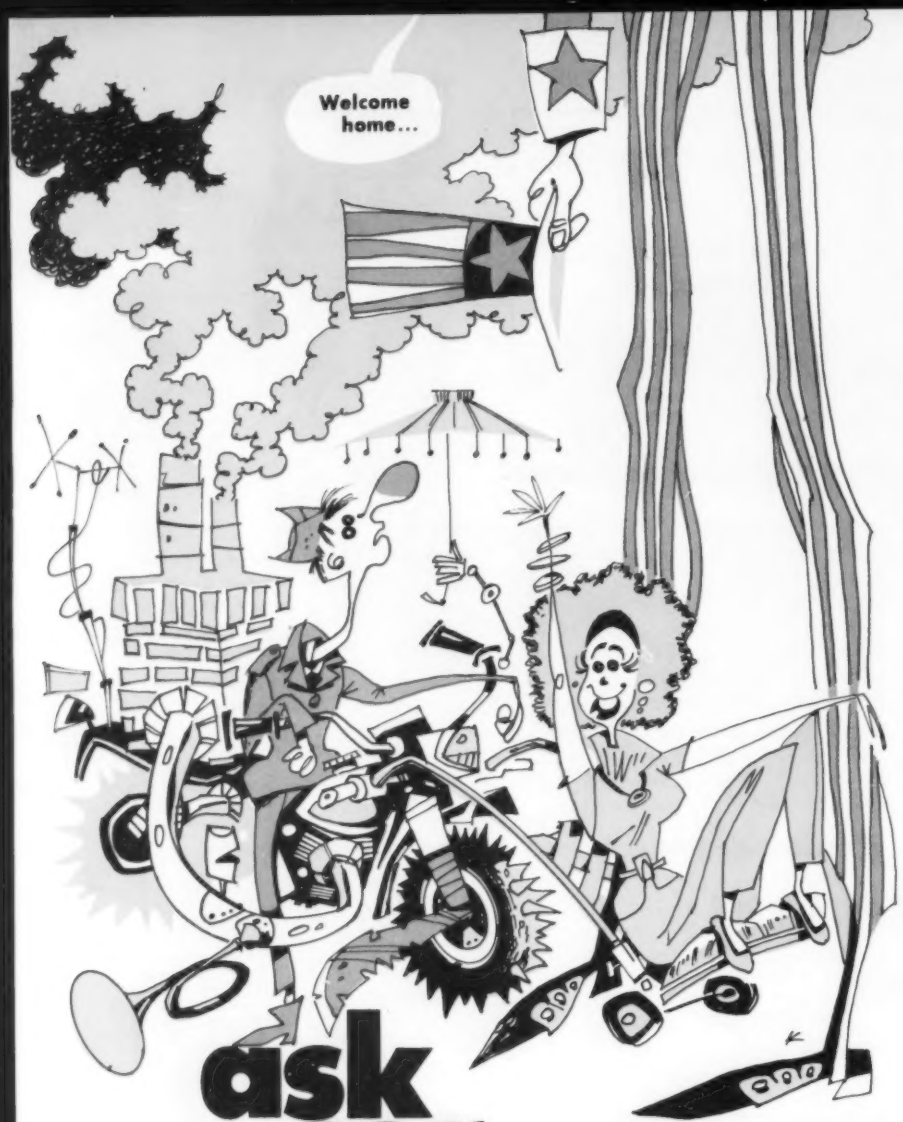
Tests also showed that an ordinary motorcycle is usually most conspicuous in the center of the right lane, rather than in the left or right portion of that lane.

Cost-benefit analyses indicated that several conspicuity treatments are cost-beneficial.



Given that about three out of four motorcycle accidents occur in daytime, one major conclusion drawn from the study is that the most effective means of improving daytime conspicuity (considering performance, *cost* and cyclist convenience) is to require motorcyclists to drive during the day with their low-beam headlamp turned on.

Of course the *cost* of the low beam is less than the modulating switch, but what *cost* are you willing to pay in pain, injury, or even your life?



ask for IT

This article is in response to many letters from readers asking how to bring home a motorcycle that wasn't built for sale in the U.S.

What a bummer! The motorcycle that you paid a premium price for in Asia or Europe is on the docks and Customs won't release it. In fact they are telling you that you are going to have to pay for its disposal. Not only that, but there's talk of fines totaling more than $20,000 and five years in jail.

Bringing a motorcycle into the United States that isn't certified for sale here is courting serious trouble. The trouble isn't limited to the unsuspecting service member trying to bring a bike into this country, either. It also spills over as a needless and expensive burden on motorcycle distributors as they try to answer daily requests for assistance.

The problem is one of awareness. Anybody importing a vehicle into this country must be aware that both the National Highway Traffic Safety Administration (NHTSA) and the Environmental Protection Agency (EPA) have requirements that must be met. If a vehicle isn't properly certified, it cannot be imported into the United States. It is that simple.

As a general rule, all motor vehicles, new or used, manufactured on or after Jan. 1, 1968, must comply with all applicable Federal Motor Vehicle Safety Standards (FMVSS) in order to be imported into this country.

In addition, the Clean Air Act requires that every motor vehicle imported into this country comply with the emission requirements that are applicable to the model year in which the vehicle was built. Emission requirements are applicable to 1968 and later model year gasoline-fueled vehicles, and 1975 and later model year diesel-fueled vehicles. Further, motorcycles manufactured after Dec. 31, 1977, must meet Federal emission requirements.

It should be noted that a manufacturer's model year usually begins during the late summer or early autumn of the previous calendar year. For example, a vehicle built in July 1967 may very well be a 1968 model.

Of course there are some exceptions, the basic exception being vehicles that were manufactured prior to the specified dates. In this case, the individual importing the vehicle must provide a statement from the original manufacturer referring to the vehicle by chassis serial number to substantiate the date of manufacture and model year. Dealer statements and foreign registration documents aren't acceptable.

The other exception isn't really an exception; it only permits conditional importation of a nonconforming vehicle provided a bond equal to the value of the vehicle, plus duty, is posted with the U.S. Customs Service. The bond is to assure that the vehicle will be brought into conformity.

In the case of the FMVSS, the individual importing the vehicle has 120 days to make the required modifications and prove that the vehicle does conform to all applicable standards. For the EPA, the importer has 90 days to bring the vehicle into conformity.

If the importer is unable to demonstrate conformity, for any reason, the vehicle must be exported, redelivered to Customs or destroyed.

Failure to prove that the vehicle has been brought into conformity with the FMVSS could mean a fine of up to $1,000 and/or a claim against the bond for the costs of disposing of the vehicle. Under the Clean Air Act, failure to properly dispose of the vehicle will mean forfeiture of the full amount of the bond and a fine of up to $10,000. Additionally, anybody who knowingly makes a false declaration is subject to a fine of not more than $10,000, or imprisonment for not more than five years, or both!

Furthermore, there is a good possibility that noise regulations will go into effect covering motorcycles manufactured on or after Jan. 1, 1983.

The easiest way to avoid these problems when buying a motorcycle overseas is to ask for an American version.

Under FMVSS, the manufacturer is required to permanently affix a tag or label to the vehicle certifying that it conforms to all applicable standards. If you don't find the properly-worded label on or near the steering head, look out. Ask for it.

Similarily, a "Vehicle Emission Control Information" label is required by the EPA. It is usually on the frame near the air cleaner. Again, ask for it.

Some manufacturers, through what they call "trading corporations," will sell certain models to you overseas that can be prepared to meet U.S. standards just before shipping back to the states. However, in these cases you will be required to go through the complete bonding and burden of compliance-proving paper work.

Because of the expense, inconvenience and potential assessments and fines involved with importing an uncertified vehicle and making that vehicle meet Federal emission and safety (and possibly noise) requirements, you would be better off purchasing a vehicle certified and labeled by the manufacturer for sale in the U.S. Ask for it.

If nothing else, the paperwork alone should be enough to discourage anyone from attempting to bring home a motorcycle not certified by the manufacturer for sale in the United States.

If you are still thinking about attempting to import a motorcycle that isn't certified for sale in the U.S., remember that the distributors in this country are not equipped to help. Generally they are not in a position to advise as to what modifications are necessary to bring the bike into conformity with the FMVSS. In the case of EPA standards, the manufacturer's U.S. representative may not have the information necessary to make conformity possible.

If the original manufacturer has not certified the specific individual vehicle you intend to bring into this country as complying with the FMVSS, you will bear total responsibility for making the vehicle conform. You will have to identify the manufacturer, contractor or individual who does the work. And you must describe in exact detail the nature and extent of the work performed. This is not only expensive and difficult, in some cases it is impossible.

Likewise, complying with the Clean Air Act is no easy matter. Modification of a nonconforming vehicle consists of replacing, adding or deleting the appropriate components to make the vehicle the same as the prototype which was submitted by the manufacturer for testing and certification by the EPA. If an equivalent U.S. model was not certified, modification is not possible.

Since the EPA certifies only those vehicles intended for sale in the U.S., they cannot provide information on the modifications necessary to bring foreign models into conformity with Federal emission standards. Only the manufacturer's U.S. representative can determine the necessary modifications.

Modifications based on instructions from anyone other than the manufacturer's U.S. representative are not accepted by the EPA. Similarly, statements from dealers or service facilities located overseas that a vehicle was manufactured in conformity, or has been modified to bring it into conformity, are not acceptable.

If modification is possible, the U.S. representative's instructions must be strictly followed. The work should be performed by an authorized U.S. dealer for the particular model vehicle.

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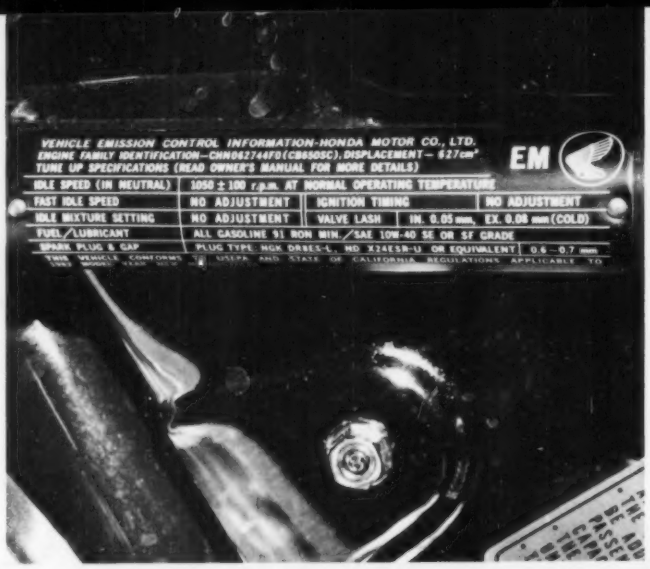

VEHICLE EMISSION CONTROL INFORMATION-HONDA MOTOR CO., LTD.
ENGINE FAMILY IDENTIFICATION—CHN0427440(CB650SC), DISPLACEMENT—627cm³
TUNE UP SPECIFICATIONS (READ OWNER'S MANUAL FOR MORE DETAILS)
EM
IDLE SPEED (IN NEUTRAL) 1050 ± 100 r.p.m. AT NORMAL OPERATING TEMPERATURE
FAST IDLE SPEED NO ADJUSTMENT
IGNITION TIMING NO ADJUSTMENT
IDLE MIXTURE SETTING NO ADJUSTMENT
VALVE LASH IN. 0.05 mm, EX. 0.08 mm (COLD)
FUEL/LUBRICANT ALL GASOLINE 91 RON MIN./SAE 10W-40 SE OR SF GRADE
SPARK PLUG & GAP PLUG TYPE: NGK DR8ES-L, ND X24ESR-U OR EQUIVALENT 0.6–0.7 mm
THIS VEHICLE CONFORMS TO USEPA AND STATE OF CALIFORNIA REGULATIONS APPLICABLE TO

ask for the DETAILS

For additional details concerning safety requirements, including regulations for motor vehicle importation and a copy of the statement of compliance form for application to import a motorcycle for personal use, contact:

Director, Office of Standards Enforcement
National Highway Traffic Safety Administration
Vehicle Safety Compliance
U.S. Department of Transportation
7th and D Streets, S.W.
Washington, D.C. 20590
(213) 426-1693

Information concerning anti-pollution emission control, including a list of manufacturers' representatives and test laboratories, is available from:

Environmental Protection Agency
Manufacturers Operations Division, EN-340
401 M Street, S.W.
Washington, D.C. 20460

Information concerning duty or other Customs matters can be obtained from:

Director, Division of Tariff Classification Rulings
Bureau of Customs
Washington, D.C. 20460

Work shouldn't be initiated until specific modification instructions are received from the manufacturer's U.S. representative.

If the representative is unable, or refuses, to provide specific instructions, the only option is to demonstrate compliance by having the vehicle tested. The testing must be done by a qualified laboratory according to the Federal Test Procedure. The cost of such a test is $800 *or more*. The risk of failing such a test is also high for vehicles not originally manufactured to meet Federal standards.

If you elect to have a vehicle tested to demonstrate compliance, the qualified testing laboratory must provide the EPA with evidence that the vehicle was tested according to the proper procedures. This evidence includes a notarized copy of an EPA test report form listing all test results.

Evidence that the vehicle has passed a state emission inspection test (including California's), or a test conducted at a dealership, doesn't demonstrate conformity with Federal emission standards.

Modifications performed overseas, either by you or a commercial facility, aren't acceptable without further verification. Vehicles modified overseas must be imported under bond pending EPA approval. This approval includes verification by a U.S. dealer that the modifications were performed upon inspection.

If you modify your own vehicle after importation into this country, these modifications must also be verified by a U.S. dealer's inspection.

The EPA may inspect the vehicle before issuing final approval of modification work, although such an inspection isn't required in every case.

If you do have the vehicle modified, you must provide the EPA with evidence that the proper modifications have been performed. The evidence must include each of the following items:

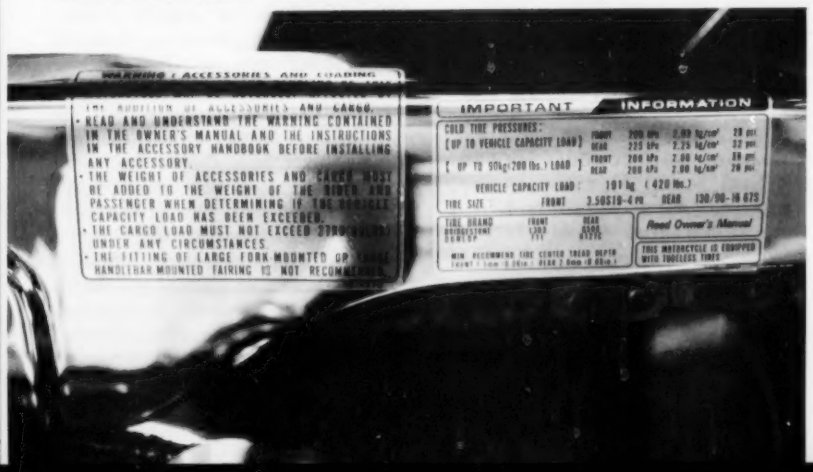
- A copy of the modification instructions provided by the manufacturer's U.S. representative.
- A signed statement from the mechanic specifying that the work outlined by the representative has been completed.
- A list of parts and part numbers for all items installed.
- Clear copies of all work orders and sale receipts.
- A statement that all removed parts were destroyed, including a description of the method of destruction.

In conclusion, the best way to avoid the expense, inconvenience and potential fines is to only purchase a vehicle that has already been certified and labeled by the manufacturer for sale in the United States. Ask for it.

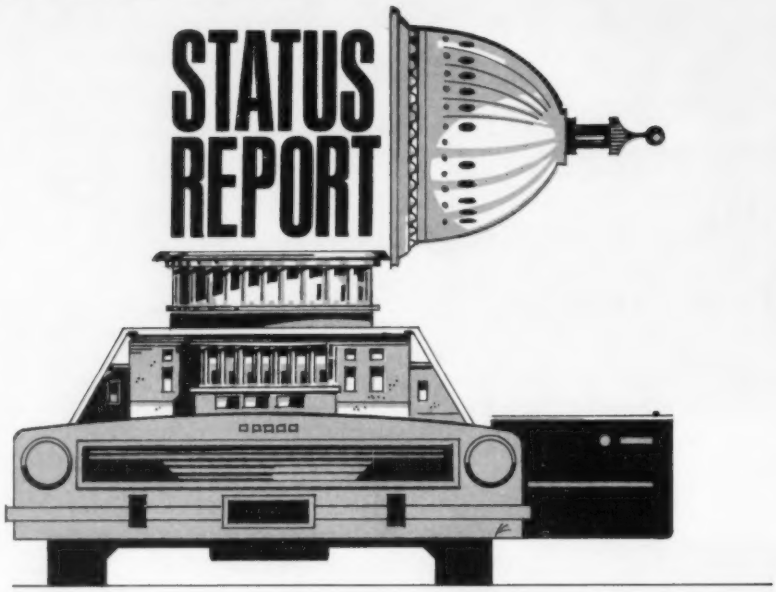
(far left)
This permanently-affixed tag verifies that this motorcycle conforms to all applicable safety standards. Ask for a bike with it.

(near left)
This "Vehicle Emission Control Information" label is required to be on the motorcycle for importing into this country. Ask for it.

(above, left, middle, right)
If you were importing a non-certified motorcycle you would have to make sure it had various DOT labels such as the one on the hydraulic brake system, brake lines and wheels, as well as many, many other specific safety systems.
(below)
And the labeling goes on and on and. . . .



STATE LEGISLATIVE STATUS REPORT



Highway safety issues took high priority in many state legislatures in 1981. Prominent were bills mandating child passenger protection and tightening drunk driver countermeasures.

This summary provided by the Highway Users Federation reports the year-end status of 1981 bills. Many bills reported here as "failed" in 1981 actually carry over to 1982 sessions. Also, some states — Connecticut and New Jersey, for instance — will not adjourn their 1981 sessions until just before they must legally convene for 1982. Therefore, a report that a bill failed does not necessarily indicate that it was defeated by vote or that the issue is dead.

This summary does not describe specific provisions of legislation. Further information may be obtained from the state departments of transportation.

Child passenger protection — Seven states approved new laws mandating use of child protection systems: Kansas, Massachusetts, Michigan, Minnesota, New York, North Carolina and West Virginia.

Rhode Island and Tennessee strengthened their existing requirements.

Maine and Virginia directed their Highway Patrols to inform the public on the need for and value of using child restraint systems.

Child protection requirements failed in 24 states: Alabama, Arizona, California, Colorado, Connecticut, Delaware, Hawaii, Illinois, Iowa, Louisiana, Maryland, Missouri, Nebraska, New Jersey, New Mexico, North Dakota, Ohio, Oregon, Pennsylvania (passed Senate; carries over), Texas, Vermont, Washington, Wisconsin and Wyoming.

Driver education funding — State funding for driver education programs in high schools was increased in three states (I) and withstood budget-cutting attempts in five others: Idaho (I), Illinois (I), New Hampshire, Ohio, Oregon (I), Vermont, Washington and Wisconsin.

Driver ed funding suffered setbacks in four states: Alaska, California, Minnesota and Texas.

Drunk driver countermeasures — Measures to tighten Driving While Intoxicated (DWI) enforcement, strengthen penalties or mandate rehabilitation programs were approved in 25 states: California, Connecticut, Delaware, Hawaii, Illinois, Indiana, Iowa, Kansas, Louisiana, Maine, Maryland, Minnesota, Mississippi, Missouri, Montana, Nevada, New Hampshire, New Mexico, New York, Oregon, Texas, Vermont, West Virginia, Wisconsin and Wyoming.

Bills failed to pass in three states: Colorado, Ohio and Pennsylvania.

Motorcycle helmets — Louisiana reinstated its helmet requirement for all operators and riders.

New or stronger helmet requirements failed in 16 states: California, Colorado, Connecticut, Hawaii, Indiana, Iowa, Kansas, Maine, Maryland, New Mexico, North Dakota, Oregon, Rhode Island, South Carolina, Texas and Wisconsin.

Bills to repeal or weaken helmet requirements failed in 14 states: Alabama, Arkansas, Florida, Massachusetts, Michigan, Mississippi, Missouri, Nevada, New Jersey, New York, North Carolina, Pennsylvania, West Virginia and Wyoming.

Periodic motor vehicle safety inspection — Bills to require safety inspections failed in five states: Illinois, Maryland, Minnesota, New Mexico and Tennessee.

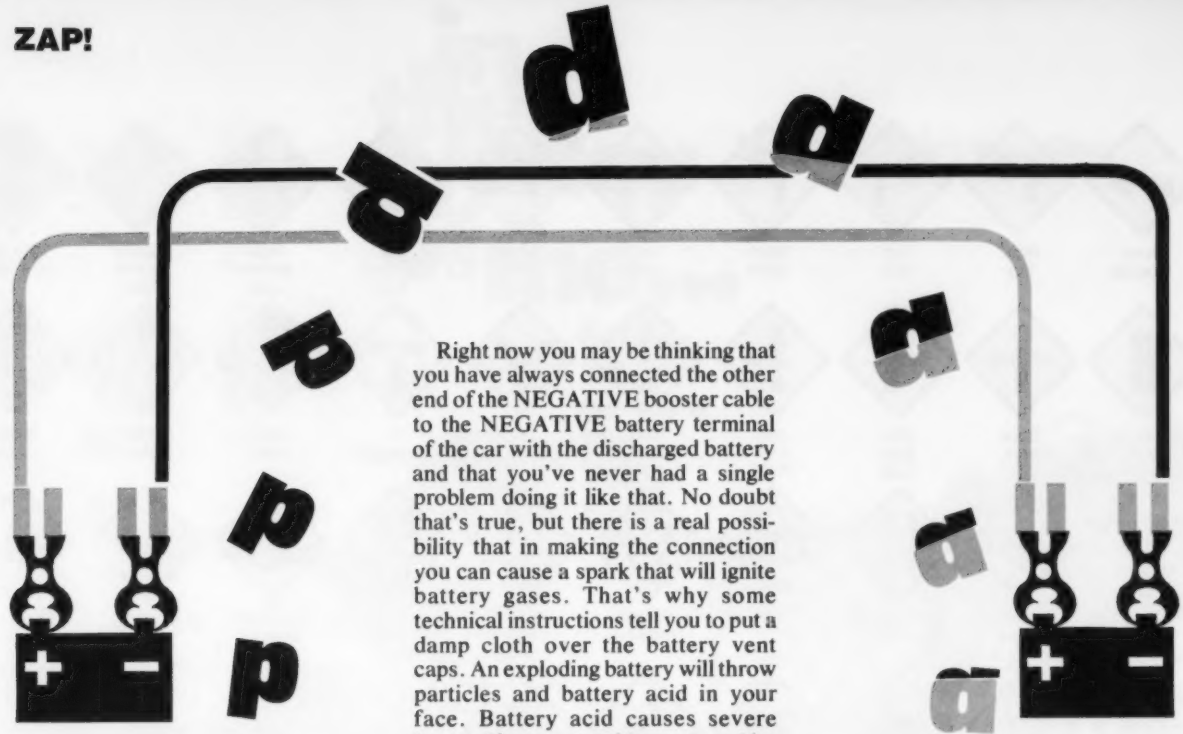
Three states repealed or suspended their inspection programs: Colorado (three-year suspension pending study of effectiveness), Florida (repealed effective Oct. 1, 1981) and Nebraska (repealed effective July 1, 1981. Study effectiveness in interim).

55 mph speed limit repeal — Three states passed repeal of the 55 mph limit — contingent upon federal repeal: Arizona, Missouri and North Dakota.

Nevada will no longer assess points for speeding between 56 and 70 mph, and will levy only a $5 "energy wasting" fine.

Bills to repeal or circumvent the national limit failed in 29 states: Alabama, California, Colorado, Connecticut, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Louisiana, Minnesota, Mississippi, Montana, Nebraska, New Mexico, Ohio, Oklahoma, Oregon, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia and Wyoming.

jumpstarts



One of the first things most of us learn to do after we begin driving is to jump-start a car with a dead battery. Oddly enough, however, most of us don't learn to do it in the preferred (that is, the safest) manner.

We do the first few steps correctly. We position the cars close but not touching. We connect one end of the POSITIVE booster cable to the POSITIVE terminal of one car, and the other end of the POSITIVE cable to the POSITIVE terminal of the other car. Then we connect the NEGATIVE booster cable to the NEGATIVE battery terminal of the car with the good battery.

Now comes the final connection and the one most drivers — even most people who work in service stations — do not do in the preferred way. The other end of the NEGATIVE booster cable should be connected to some point away from the battery on the car frame, engine block or other good metallic ground (except the carburetor or the fan).

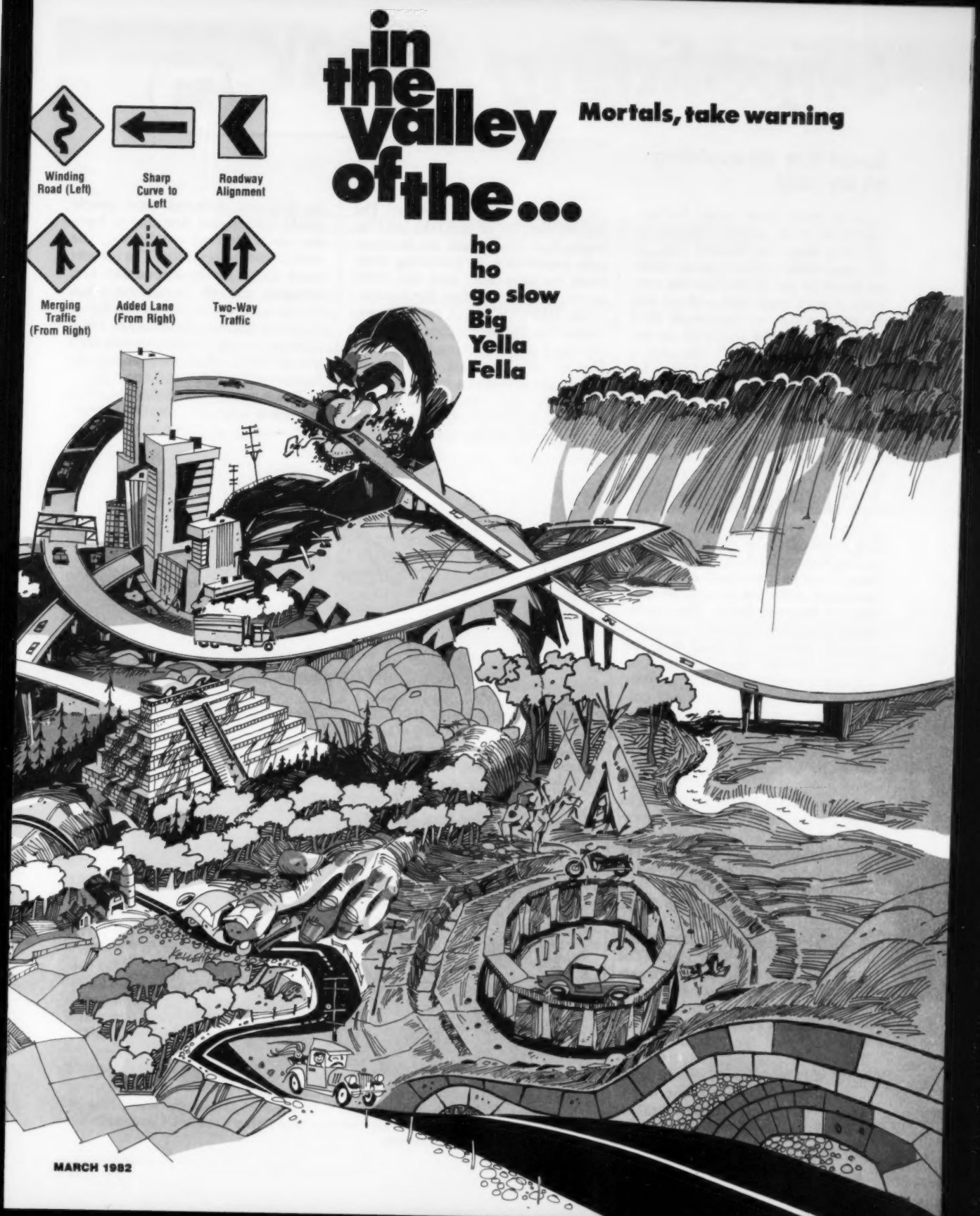
Right now you may be thinking that you have always connected the other end of the NEGATIVE booster cable to the NEGATIVE battery terminal of the car with the discharged battery and that you've never had a single problem doing it like that. No doubt that's true, but there is a real possibility that in making the connection you can cause a spark that will ignite battery gases. That's why some technical instructions tell you to put a damp cloth over the battery vent caps. An exploding battery will throw particles and battery acid in your face. Battery acid causes severe burns. If you get acid on your skin, flush well with water. If you get it in your eyes, flush with water and get medical attention immediately.

Jump-starting is a procedure which can be dangerous to you and harmful to your automobile — unless you are careful and do it right. Here are some Do's and Don'ts for jump-starting:

- **Do follow instructions** in the owner's manual (if you have one) for your vehicle when jump-starting your car.
- **If you don't understand** instructions for jump-starting, don't attempt the procedure. Get someone who KNOWS to do it for you.
- **Don't smoke.**
- **Do make sure you know** which is the POSITIVE and which is the NEGATIVE terminal on your battery, and the battery being used to obtain the booster charge.
- **Do make sure** the booster battery and the rundown battery are of the same voltage before trying to jump-start your car.

- **Do use extreme caution** when connecting or removing booster cables. Grasp the cables by the insulated handles — never by the bare metal ends. Be careful of moving engine components like the fan and fan belt.
- **Do flush your eyes or skin** immediately with large quantities of cool water if battery acid comes in contact with them. If acid reaches your eyes, *get medical help promptly.*
- **Do be very careful** when disposing of excess acid and the acid container if you buy a "dry" battery and put the acid in yourself.
- **To prevent leakage of acid,** never turn any battery (sealed or other type) upside down.
- **DON'T connect** "+" to "-," or "-" to "+" when jump-starting.
- **DON'T let your head** get too close to the battery when connecting booster cables.
- **Remove the battery cables** in the reverse order from which they were attached.

Truck Crossing
Right Turn
Left Turn
Right Curve
Left Curve
Right Reverse Turn
Left Reverse Turn
Right Reverse Curve
Left Reverse Curve
Winding Road (Right)
Pavement Ends
Cross Road
Side Road (Left)
Side Road (Right)
Side Road (Left Angle)
Y Intersection
T Intersection
Stop Ahead
Yield Ahead
Signal Ahead
Narrow Bridge
Fire Station
Road Narrows (From Right)
Hill
Divided Highway
Divided Highway Ends
Slippery When Wet
Handicapped Crossing
Playground
Snowmobile Crossing
12-6
Low Vertical Clearance
Equestrian Crossing
Farm Machinery Crossing
Cattle Crossing
Deer Crossing
Pedestrian Crossing
School Crossing
Bike Crossing
School Zone
* red
green


in the valley of the...
Mortals, take warning
ho
ho
go slow
Big
Yella
Fella
Winding Road (Left)
Sharp Curve to Left
Roadway Alignment
Merging Traffic (From Right)
Added Lane (From Right)
Two-Way Traffic
MARCH 1982

Slipsliding AWAY

Some tips on avoiding an icy skid

In a small place called Stevens Point, Wisc., is what appears to be a large ice skating rink. A small tractor with a plastic-bristled brush on the front whips the previous night's snow into a cloud and deposits it on the snowbank that stands four or five feet high on the perimeter of the "rink." The area, a sheet of glare ice about 200 feet by 1000 feet, is ready.

But no ice skaters arrive. Instead, cars drive slowly onto the ice and men step cautiously out to place bright orange cones in various patterns. That done, the men return to a mobile home trailer at the side of the ice to warm up and wait for the next group of students for the Winter and Emergency Driving Workshop.

The National Safety Council holds these two-day workshops over a two-week period in January of each year at Stevens Point. The workshops are short, intensive, hands-on sessions designed to teach safe car handling on ice. They are open to driving instructors only. Driver trainers from high schools and colleges, and those who teach police, school bus drivers, emergency vehicle drivers and even commercial and industrial drivers, attend the workshops.

The purpose of these sessions is to give the participants the opportunity to develop and perfect special driving skills and techniques in an adverse but controlled environment. Inside classroom instruction gives the "students" a basic understanding of the principles underlying these techniques, so they can pass along their knowledge to those they teach. The NSC also hopes the driver trainers will work to establish similar workshops in their own communities.

So these workshops are not for the beginner. And the NSC purposely keeps the classes small, with a maximum of 15, so each driver will get as much time as possible at the wheel. The first day, NSC's volunteer instructors demonstrate the driving maneuvers and teach the drivers as the latter take turns at the wheel. The second day, the drivers take over the instruction themselves so they can gain experience at providing feedback to students, and the NSC instructors just go along for the ride.

On DRIVER's visit to the workshops, the winter Wisconsin weather provided an interesting lesson. The first day was overcast, with outside temperature of about 10 degrees and a 30-mph wind. The second day the sun had appeared, the winds were light and the temperature rose into the twenties. Although most people would assume the first day to have the worst driving conditions, the truth is just the opposite. The ice was much slicker on the second day. Ice, strangely enough, is slickest when the temperature is around the freezing point, because there may be a film of water on top. Drivers should keep this in mind when they check the thermometer on winter mornings.

Teaching proper handling of a skid is a prime concern at the workshops. For avoiding or controlling skids on

This automobile, brought by the volunteer instructors from the Missouri Safety Center at Central Missouri State University, was the one used in the skid control exercises at the Winter Driving Workshops.

In the trunk is an electronic skid inducer, which locks up the rear wheels of the car on a signal from a hand control used by the instructor.

This driver starts out okay on the serpentine, but then he exceeds his critical speed and does a 180 at the end of the course. At the NSC Winter and Emergency Driving Workshops, the instructors teach the proper way to handle cars on slick surfaces to avoid this kind of spinout.

ice (or on snow, for that matter) tire chains are unequalled. However, the instructors *want* the students to skid, so they can perfect their skid control techniques. Therefore, the cars are equipped only with snow tires. All of the exercises in the workshop can involve skidding, and in one of them the instructors *cause* the skids.

The students are taught that there are three points in a skid at which the car can be straightened out. The first is at the 20-degree point. As the car goes past 20 degrees off the straight-ahead course, the driver must wait for the second skid-stopping point, 180 degrees, when the car is facing in the opposite direction. The third point is at 360 degrees, when the car has "gone full circle."

Skids can be stopped by the technique of steering into the direction of the skid. If the rear of the car is sliding to the left, the driver must steer to the left. Likewise, if the car's tail skids to the right, he must steer to the right. Use of too much correction in the steering can make the situation worse, so the steering must be light.

There are three kinds of skids. The *braking skid* results when steering control of the car is lost because the wheels have been locked. A *power skid* happens when the wheels are spinning too fast for the driving surface, and the rear end of the car swings out. This is what the average driver is usually referring to when he uses the word "skid." A *cornering skid* occurs when the car attempts to take a curve at a speed faster than the tire-road cornering traction limits. The car literally "leaves the road."

The workshop's serpentine course can provide experience with all three kinds of skids. To properly handle the serpentine, the driver must increase his speed through the exercise until he reaches his "critical speed" — the maximum speed he can complete the course without mishap.

The drivers learn they must drive as close as possible to the cones to minimize the steering corrections they must make to get through the next opening. On dry pavement, deviations from the closest pass, and the resulting steering corrections, would slow the time through the cones. On ice, time is not the important factor; safety is. Deviations from the close point, and steering corrections, bring the car closer and closer to that critical 20-degree "point of no return." On the serpentine, it is easy to pass that point and cause the car to spin out.

Stopping on ice is difficult. Traveling at 20 mph, a car can be stopped in 17 feet on dry pavement. From the same speed on wet pavement, it takes 28 feet to stop. On loosely-packed snow, the distance lengthens to 60 feet. On glare ice, the shortest stopping distance from 20 mph is *150 feet*, nearly 10 times as far as on dry pavement. (This, again, is with only snow tires. Tire chains could cut that 150 feet by at least half.)

A braking technique called "threshold braking" is vital for stopping on ice. The name comes from the fact that the car's maximum braking force is exerted not at the locked-wheel point, but just before that point. The only way to attain this kind of braking is by pumping the brakes — stepping on the brakes, letting off and stepping on again, as many times as necessary. With threshold braking the driver can learn to stop the car on ice in as little as 150 feet. Without such braking, the workshop attendees learn they are lucky to stop before they reach a barrier more than 250 feet away.

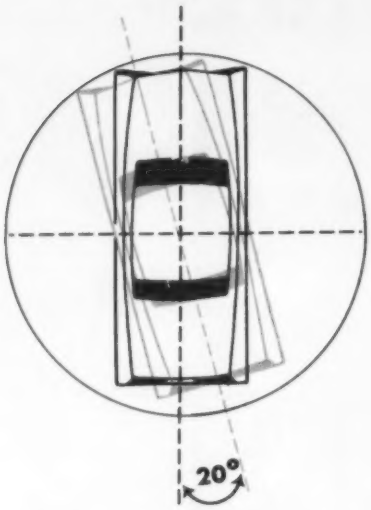
continued

The passing exercise becomes easy only with practice. The drivers must start out very slowly and gradually build up to the critical speed.

A small tractor, used to brush the snow off the test course for the National Safety Council's Winter and Emergency Driving Workshops, kicks up a small blizzard.

slipsliding away

continued



This illustration shows the farthest your car can skid around before you lose control — 20 degrees off the straight-ahead course. If you let the car get beyond that point, you have to pull out of the skid at 180 degrees or, failing that, 360 degrees. Twenty degrees isn't much, so be careful.

Worse, if they lock the wheels, they may lose control of the car entirely. Threshold braking not only aids in stopping, it also leaves the driver with more control of the steering.

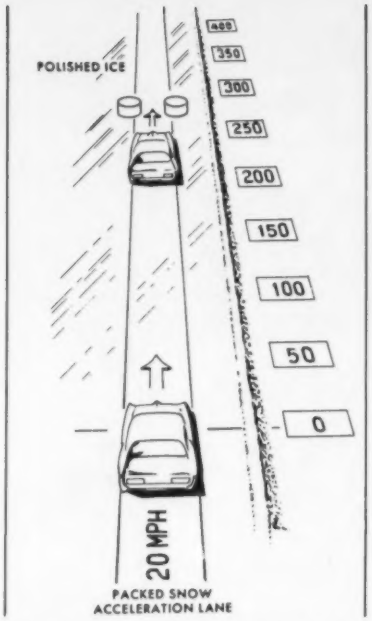


Diagram #1: In the stopping exercise, the car accelerates to 20 mph and the driver attempts to stop before hitting a barrier over 250 feet away. Locking the brakes not only makes stopping difficult but also lessens the control the driver has over the car's direction. In "threshold braking," the driver pumps the brakes to keep them just short of locking up. This provides the maximum braking power and enables him to maintain control of the car.

By using techniques such as these, the average driver should be able to get through the winter season without "slipsliding away." See you out on the ice.

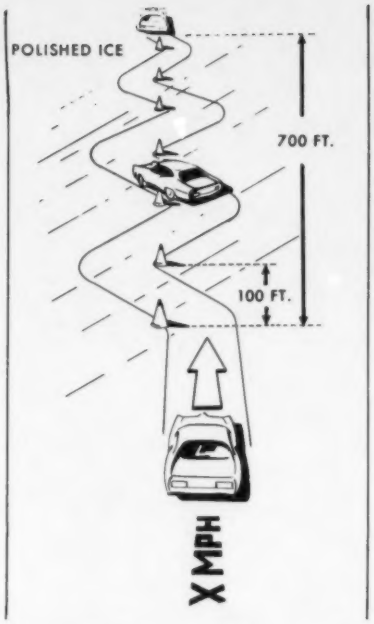


Diagram #2: The serpentine is designed to teach control while steering. The driver zigzags through a set of cones, attempting to control the car to avoid a spinout. To do this one correctly, the driver must increase speed through the exercise to a "critical speed," different for each driver, the maximum speed he can go without losing control.

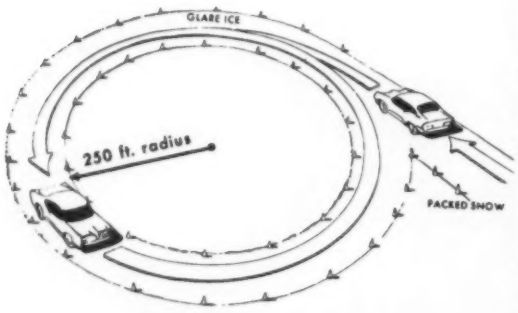


Diagram #3: The skid control exercise is done on a circular course with a radius of about 300 feet, part glare ice and part packed snow. The vehicle contains an electronic "skid inducer," a mechanism used by the instructor to lock the rear brakes. As the driver drives around the circle at his "critical speed," the instructor causes a skid. The driver then must regain control of the car. When his performance is good enough, he reverses direction on the circle and does the exercise again.

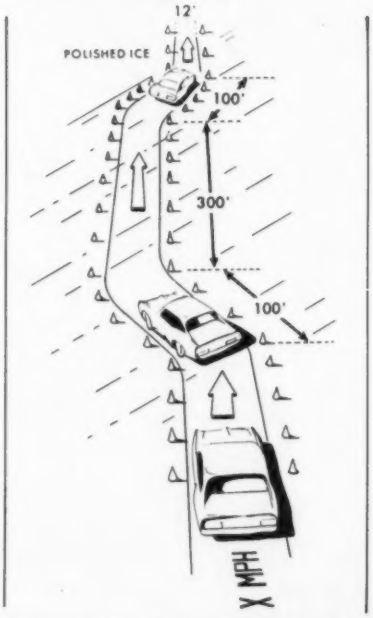


Diagram #4: In the passing maneuver, the course is a 12-foot lane with a bend. The driver must take it at a certain test speed and angle his car as though it were passing another vehicle and then return to the right, without losing control. This exercise presents the possibility of all three kinds of skid — the braking skid, the power skid and the cornering skid (see text).

ON SITE

The Winter and Emergency Driving Workshops have been held at Stevens Point since 1965, during which time about 800 people have attended. The driving course is prepared with the cooperation of the city of Stevens Point and its engineering department. The test site is flooded with water, which freezes to provide a very slick surface on which to drive. The city helps by clearing off any heavy snowfall, so that the National Safety Council people have only to "dust off" any remaining snow to restore the glare ice surface.

LESS IS MORE

Are you driving less now and getting worse at it?

"The lullaby of Broadway." A dull, repetitive commuting routine can make you careless and inattentive to the needs of safe driving.

The numbers on your odometer turn less frequently now. The thousands digit used to turn in less than a month, and now it changes only every six to seven weeks. It's getting so about the only time the car is used is to get you to and from work on those days when you chauffeur the car pool, and for a few errands. Since the car pool began, it sits at home every other day, and when it goes anywhere it stays within the city limits.

That kind of driving should be both more economical and safer. You feel you're saving money. "I'm saving wear on the car and its tires." Perhaps your insurance company is even giving you a break on your premiums because you're not driving to work every day.

It's possibly safer, too. You think, "I'm driving less, and therefore exposing myself to less danger from the other cars and the environment."

These ideas are true — less driving equals less use of gasoline, and less driving equals less exposure to danger. But they only tell part of the story. There are too many factors involved in driving to make it so simple as that. We want to look at some matters that should concern you as a less-frequent driver.

Less driving is more use of gasoline. In one way, less driving will increase the use of gas. A car delivers its best mileage at between 30 and 40 miles per hour (mph). Most commuting is done on city streets with stop-and-go traffic, which is the worst type of driving for good mileage. (Driving five mph or less accounts for 15 percent of all driving in this country, but it consumes 30 percent of all the fuel.)

Further, cars deliver their best mileage when they are fully warmed up. On most short commutes the car will reach the point of being fully warmed up about the time you get to work. So mileage will suffer for those times you drive, although total consumption of gasoline may be less.

Less driving is more wear. An additional problem of not being warmed up is that the wear on the car is increased. Short drives with many stops and starts are the hardest kind of driving, as we said. On short drives the engine is prone to excessive build-up of water vapor and sulfuric acid in the cylinders, which will damage the engine and which will also get into the oil, sludging up the works.

But perhaps of more immediate concern is the effect of less driving on the driver himself. Just as frequent, long drives can bring about a routine, so can less frequent, short drives. When driving becomes a routine, it is at best a dull, automatic activity that the driver doesn't think about. Worse, it can become a bore or even an annoyance to be endured.

Less is sometimes less — less driving equals less enjoyment of it. When you are enjoying something, all your senses are alert and you are taking in everything you can by sight and hearing. When you are not enjoying what you are doing, your mind wanders to other, more pleasant things. Short, dull drives over the same piece of pavement day after day will lead to boring routine or annoyance. So, if you're not enjoying the driving, your mind will turn to other things.

Less driving is less awareness. You might think that less driving would make you more aware of small differences in the environment. More often, however, the opposite is true. If your driving is only commuting it will become so automatic that only a major disturbance of the routine will grab your attention. You become less aware of the surroundings and you overlook things that might be hazardous. Simply the time of day you drive could lower the awareness. Commuting driving is done when you are at lowest efficiency — in the morning when you're not fully awakened from an eight-hour nap, and in the evening after eight hours of work.

Less driving means less practice. Anything you don't keep practicing you don't perform very well. This is true for athletes and musicians and it's true for motorists, too. The less you drive, the worse you drive — like the "Sunday driver."

Here are a few suggestions on how to handle these problems.

Less short trips is more mileage. For the car's health, avoid short drives whenever you can. Combine your short trips as often as possible. Do all your shopping and errand-running at once, so the car remains warm and operating at its peak efficiency.

For yourself, here are a few ways to counter the problems of less driving.

Less sameness is more attention. You can avoid the boredom and inattention that comes from driving the same old road every day if you vary your route to work once in a while. Try taking a longer way when you have the extra time. (You may even discover it's quicker. Side streets can sometimes be faster because there is less traffic and fewer lights.)

But don't make yourself in a hurry, because less time equals more speed. If you don't think about having to drive to your destination you may allow less time for it and you may leave late. Allow time to get to where you're going. Speeding brings on a greater danger of accidents.

Less fatigue means more safety. For any drive, make sure you're rested and alert. In the morning, take time for that cup of coffee to get yourself going. A few exercises are also a good idea. If your body is awake, your mind will be, too.

Less distraction means more attention. After work, take a couple of minutes to unwind from the day. Leave your working concerns at the office so they don't interfere with safe driving. If you must think about work outside the nine-to-five hours, at least file it away mentally until you get to your front door. The same goes for other concerns — save them for later, when you're out of the car. When you're behind the wheel, your only job is safe driving.

Less staring equals more attention. Keep your eyes moving as you drive. Don't stare at one point on the street. Watch the traffic, the parked cars by the curb, the signs, the lines on the pavement, the pedestrians, the stray animals. This will keep you ready for anything.

Driving less can equal more efficiency, but only if you *think* about the driving, and *only* the driving.

tteecc!h!h double tech with tsgt ron lathrop

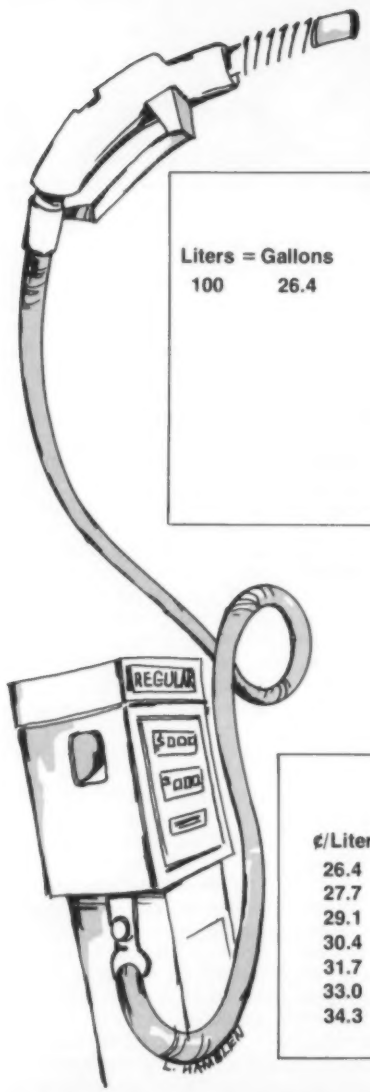
COMMENT: What's happening at the gas pump? First it was half-gallon pricing, now it's liters with a sign on top of the pump reflecting the price per gallon. How am I supposed to figure out what my miles per gallon are? What happened to the gallon?

REPLY: Basically it is a case where two plus two equals one. Roughly, every four liters you pump into your tank is a gallon (actually, four liters is a gallon plus three tablespoons and 1⅞ teaspoons).

The reason for the changeover is because the vast majority of gasoline pumps in this country were unable to register a price of a dollar or more per gallon. This became more confusing to the customers because they had to double the total amount shown on the pump to figure out what they had to pay. Selling gasoline by liters was the answer since the total dollar amount shown on the pump is the amount owed.

If you divide the number of liters purchased by 3.785412 you'll know the number of gallons pumped and can figure your mpg from there. Also, multiplying the price per liter by 3.785412 will give you the price per gallon.

Here are a few charts to help you with your conversions.



LITERS TO GALLONS

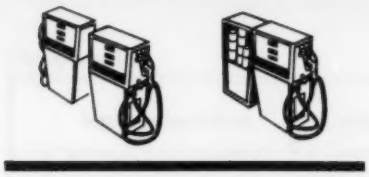
Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons
100	26.4	10	2.6	1	0.3	0.1	0.0
		20	5.3	2	0.5	0.2	0.1
		30	7.9	3	0.8	0.3	0.1
		40	10.6	4	1.1	0.4	0.1
		50	13.2	5	1.3	0.5	0.1
		60	15.9	6	1.6	0.6	0.2
		70	18.5	7	1.8	0.7	0.2
		80	21.1	8	2.1	0.8	0.2
		90	23.8	9	2.4	0.9	0.2

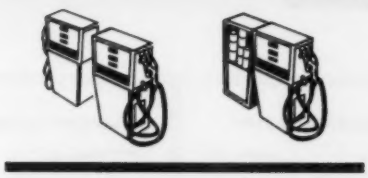
For example, if you pump 35.6 liters it is 9.4 gallons:

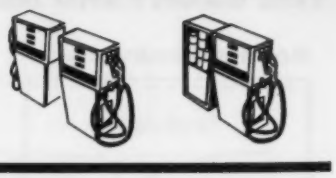
30.0 liters = 7.9 gallons
5.0 liters = 1.3 gallons
0.6 liters = 0.2 gallons
35.6 liters = 9.4 gallons

PRICE PER LITER TO PRICE PER GALLON

¢/Liter	=	$/Gallon	¢/Liter	=	$/Gallon	¢/Liter	=	$/Gallon
26.4		1.00	35.7		1.35	44.9		1.70
27.7		1.05	37.0		1.40	46.2		1.75
29.1		1.10	38.3		1.45	47.6		1.80
30.4		1.15	39.6		1.50	48.9		1.85
31.7		1.20	40.9		1.55	50.2		1.90
33.0		1.25	42.3		1.60	51.5		1.95
34.3		1.30	43.6		1.65	52.8		2.00







APPROXIMATE MILES PER GALLON

Round off the miles traveled to the nearest 10 miles. Then round off the liters purchased to the nearest even number liters. Then find the approximate mpg in the table.

LITERS PURCHASED	MILES TRAVELED																								
	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350
10	38	42	45	49	53	57	61	64	68	72	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12	32	35	38	41	44	47	50	54	57	60	63	66	69	73	—	—	—	—	—	—	—	—	—	—	—	—
14	27	30	32	35	38	41	43	46	49	51	54	57	59	62	65	68	70	73	—	—	—	—	—	—	—	—
16	24	26	28	31	33	35	38	40	43	45	47	50	52	54	57	59	62	64	66	69	71	73	—	—	—	—
18	21	23	25	27	29	32	34	36	38	40	42	44	46	48	50	53	55	57	59	61	63	65	67	69	72	74
20	19	21	23	25	26	28	30	32	34	36	38	40	42	44	45	47	49	51	53	55	57	59	61	62	64	66
22	17	19	21	22	24	26	28	29	31	33	34	36	38	40	41	43	45	46	48	50	52	53	55	57	59	60
24	16	17	19	21	22	24	25	27	28	30	32	33	35	36	38	39	41	43	44	46	47	49	50	52	54	55
26	15	16	17	19	20	22	23	25	26	28	29	31	32	33	35	36	38	39	41	42	44	45	47	48	50	51
28	14	15	16	18	19	20	22	23	24	26	27	28	30	31	32	34	35	37	38	39	41	42	43	45	46	47
30	13	14	15	16	18	19	20	21	23	24	25	26	28	29	30	32	33	34	35	37	38	39	40	42	43	44
32	12	13	14	15	17	18	19	20	21	22	24	25	26	27	28	30	31	32	33	34	35	37	38	39	40	41
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42	—	10	11	12	13	14	14	15	16	17	18	19	20	21	22	23	23	24	25	26	27	28	29	30	31	32
44	—	—	10	11	12	13	14	15	15	16	17	18	19	20	21	22	22	23	24	25	26	27	28	28	29	30
46	—	—	10	11	12	12	13	14	15	16	16	17	18	19	20	21	21	22	23	24	25	26	26	27	28	29
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52	—	—	—	—	10	11	12	12	13	14	15	15	16	17	17	18	19	20	20	21	22	23	23	24	25	25
54	—	—	—	—	10	11	11	12	13	13	14	15	15	16	17	18	18	19	20	20	21	22	22	23	24	25
56	—	—	—	—	—	10	11	11	12	13	14	14	15	16	16	17	18	18	19	20	20	21	22	22	23	24
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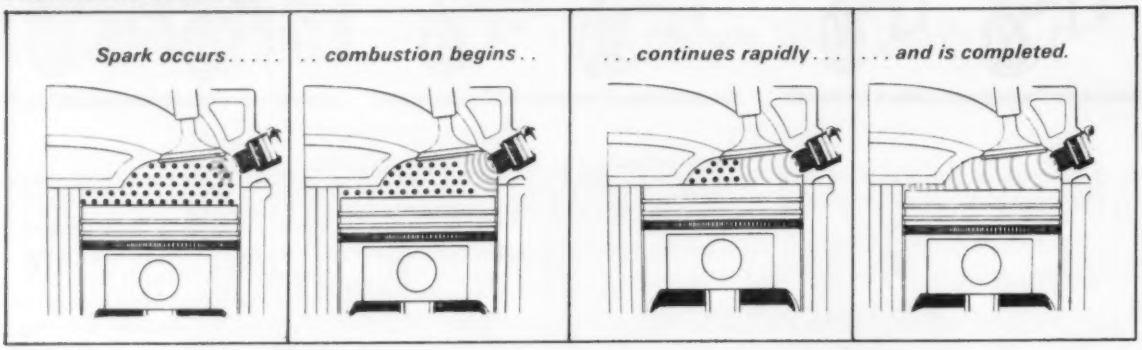
70	—	—	—	—	—	—	—	—	10	10	11	11	12	12	13	14	14	15	15	16	16	17	17	18	18	19
72	—	—	—	—	—	—	—	—	—	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	18	18
74	—	—	—	—	—	—	—	—	—	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	18
76	—	—	—	—	—	—	—	—	—	—	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17
78	—	—	—	—	—	—	—	—	—	—	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17
80	—	—	—	—	—	—	—	—	—	—	—	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17

Normal Combustion



DETONATION IS NO "KNOCK KNOCK" JOKE

Whether we call it "ping" or "knock," detonation is a noise most of us didn't tolerate in the past. However, today we are told that it is the sound of fuel economy — a noise we should learn to love.

Granted, an infrequent knock indicates the maximum fuel economy is being obtained from the gasoline's octane quality. And it is true that buying a higher octane gasoline is an unnecessary expense.

Today's cars with their lean fuel mixtures run hotter and are more likely to ping some. This is especially true because the ignition timing is advanced to the point of knocking on detonation's door (pun intended). Reckless use of fuels and oils along with poor maintenance habits also contribute to pinging. Additionally, aggressive driving, such as slamming the right foot down on the gas pedal, makes knocking more serious.

What's all the noise? Internal combustion engines develop power from expanding gases. The expanding gases are the result of the burning of the air/fuel mixture. Provided the air/fuel mixture is proper, the timing correct, and the anti-knock (octane rating) quality of the fuel meets the engine's needs, this burning process occurs evenly and steadily. While the engine is operating, this normal combustion process is repeated many thousand times every minute.

However, there are various forms of abnormal combustion which are not only troublesome but can be expensive when they cause pistons, spark plugs and other engine parts to fail. Detonation and preignition are two abnormal combustions that can cause severe damage to internal engine components. Although they are different phenomena, they are quite similar in origin and one can incite the other.

When the anti-knock value of the fuel doesn't meet the engine requirements, you get detonation. Piston motion and compression of the fuel/air charge raises temperature and pressure to the point that the mixture begins burning just after ignition. The flame front from this spontaneous burning and the other flame front from the spark plug ignition collide, applying extreme hammering pressures on the piston and other engine parts. The "ping" or "knock" noise is caused by the intense pressure waves making the cylinder walls vibrate. The pounding pressures that damage pistons also increase the heat factor and can cause preignition.

Preignition is just what the term implies. Hot surfaces, high pressures, a spark or flame ignites the fuel-air mixture in the engine cylinder before the ignition spark occurs at the plug.

First things first. How do you know what is a minor ping as compared to a serious, engine-damaging knock? You're going to experience ping when you are driving a heavily loaded car uphill. If you back off the accelerator a bit, it should smooth out. Low humidity can cause knocking in an otherwise smooth-running engine and the older a car gets the more likely it is to knock.

For a quick test, drive a few miles until the engine is warmed up. Come to a complete stop, then accelerate hard. If the engine is going to knock, it will do so now. This doesn't mean the engine will knock unduly during smooth, gentle acceleration. But if you get spark knock consistently, something's got to be done.

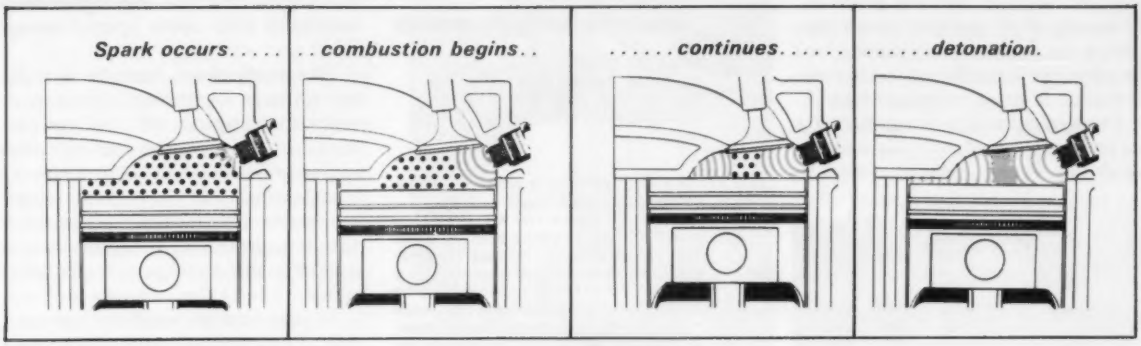
Start at your gasoline pump. Check the octane rating of the gas you usually buy. The pump must be labeled with a yellow sticker that gives you the minimum octane number of the gasoline being pumped.

If you are getting a regular knock with your usual regular unleaded, consider changing stations to one that offers a higher octane number regular unleaded. Or start using the higher-octane "premium" unleaded available at many stations.

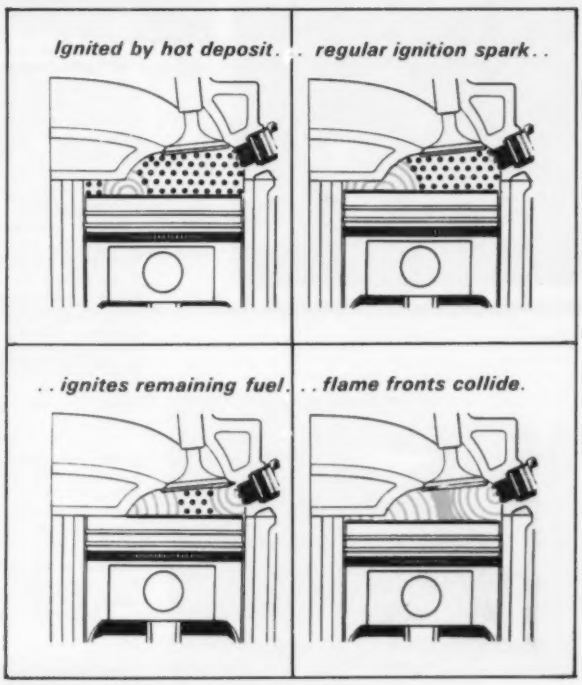
Older cars that were designed to use leaded premiums present special problems. There are still a few refiners producing leaded premiums, but not many. The solution is to blend leaded regular with unleaded premium to obtain the higher octane. If you need a 16-gallon fillup, pump four from the regular pump and 12 from the unleaded premium. If you still get knock, work your way towards a 50-50 blend of regular and unleaded premium.

What's next? If the ping is still bad, you might retard the timing.

Detonation



Preignition



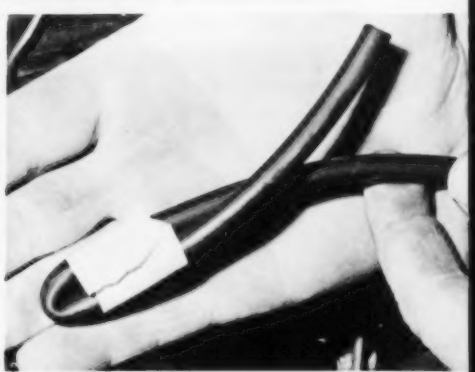
Ignition timing must be right on specifications.

The timing must be right on specifications to begin with, so clean the timing marks and chalk or paint the specified mark so you're sure of making no mistakes. Being a couple degrees overadvanced isn't likely to cause a consistent knock, but being six to eight degrees advanced can almost guarantee an unhealthy ping. If you pushed your timing ahead 20 degrees looking for more power, what you'll get is a few melted pistons.

If the timing is right on spec and you still have knock, retard the ignition timing until the ping goes away.

continued

The vacuum gauge offers clues that point to a leak.



Examine each hose.

However, if it requires more than four or six degrees you'd better look for other problems because your performance is going to fall off badly.

There might still be an ignition-timing problem even if the basic timing is right on. Weak springs could be allowing the mechanical advance to zoom ahead when you accelerate. To make an accurate check you'd need an adjustable timing light or a mechanic with some special equipment.

As a rough check, turn the distributor rotor in its normal direction — with the engine off, of course. Against the mechanical advance spring pressure it should turn about a quarter-inch. If there isn't much resistance, inspect the mechanism. If the weights don't bounce back quickly, the springs are probably weak.

If you suspect weak springs, you can chance replacing them since they are relatively inexpensive. They're easy to get at on General Motors V-8s; however, you'd have to remove the distributor plate to get to other makes' springs.

Although it is not very likely, the vacuum advance might also be over-advancing. However, usually when the vacuum unit goes out to lunch it retards rather than advancing.

Leaking to lean. As was pointed out earlier, today's cars run lean. If the fuel/air mixture becomes extremely lean, this can trigger knocking, too.

The leading cause of too-lean mixtures is vacuum leaks. Bad vacuum hoses, poor vacuum hose connections, loose intake manifolds, loose carburetors and bad gaskets on intake manifolds and carburetors are leading candidates for leak sources.

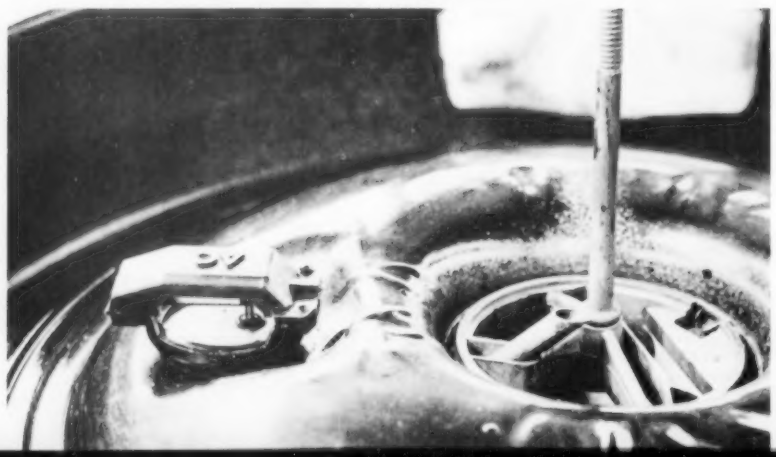
If a vacuum-gauge reading is even a couple of inches below normal, there's a good chance there's a leak. Normal is between 17 and 22 units, although some newer four- and six-cylinder models deliver at 15 inches. There's a drop of one inch for each 1,000 feet above sea level. See the January 1980 DRIVER for detailed vacuum gauge instructions.

Start by checking all vacuum hoses, paying special attention to connections. Then squirt some oil around the carburetor base. If the vacuum rises briefly, the oil has temporarily sealed a leak. Tightening the bolts might provide a fix, but more than likely you'll have to replace a leaking gasket.

Clogged or faulty fuel lines, fuel filter or fuel pump can also contribute to lean fuel/air mixtures.

GM models have incarburetor fuel filters.

The heat flap in this thermo air cleaner isn't fully open.



The thermo sensor in the air cleaner might be faulty.

WHAT'S THE OCTANE NUMBER? OR WITH A PUMP 85 YOU GET KNOCK

An auto's gasoline's octane number indicates its anti-knock quality.

Numbers below 100 are arbitrarily based on the knocking tendencies of the hydrocarbons' normal heptane and isooctane. Normal heptane has a greater knocking tendency than commercial gasolines and has been assigned an octane number of zero. Isooctane has much less tendency toward knocking than gasolines that were available when the scale was established and has been assigned an octane number of 100.

An octane number of less than 100 is the percentage by volume of isooctane blended with normal heptane that produces borderline detonation under the same conditions as the fuel being tested. Numbers more than 100 are based on the milliliters of tetraethyl lead added to isooctane to give the same knock intensity as the test gasoline.

There are two test methods for evaluating anti-knock quality. The Research Octane Number (RON) is determined by testing gasoline in laboratory engines under relatively mild conditions. The Motor Octane Number (MON) is obtained under relatively severe conditions. RON's tend to be high, roughly 100 for premium and 94 for regular. MON's are lower, roughly 92 for premium and 86 for regular.

Octane numbers posted on U.S. gasoline pumps are roughly the average of RON plus MON or (RON + MON)/2. These numbers on the yellow labels required by the Federal Trade Commission are usually four lower than RON. So, if an auto maker recommends using a gasoline with a minimum RON of 91, gas with a pump rating if 87 or higher can be used.

Too hot. Overheating may also affect the fuel/air mixture, causing the fuel to overvaporize and ignite in the combustion chamber to produce knock.

On a warm engine, the heat flap in the air-cleaner snorkel should be down, closing off the heat duct. A thermostatic air cleaner that sticks in the heat-on position will block the snorkel. The thermostatic sensor in the air-cleaner housing will have to be changed after the vacuum hose from the diaphragm unit has been disconnected. If the engine has a thermostat or thermostatic coil in the snorkel, that part or the entire snorkel will have to be replaced instead.

A manifold heat-control valve that sticks can also cause this problem. Self-contained units can be freed with an application of solvent on the shaft. It may be necessary to tap on the counterweight to free it. A bad thermostatic vacuum valve usually contributes to the vacuum-diaphragm manifold heat-control valve sticking. With the engine warm, remove the hose from the diaphragm unit. If the exhaust flap link moves, you'll have to change the thermostatic vacuum valve threaded into the engine's water jacket.

Engines will run too hot as the result of low coolant level, weak coolant and fan problems as well.

Costly disconnection. A lot of people believe that if they disconnect the exhaust gas recirculation (EGR) valve they'll regain performance and fuel economy. What they are actually doing by disconnecting the EGR system is preventing a shot of inert exhaust gas that helps reduce combustion chamber temperatures. As the combustion chamber temperatures go up without the EGR function, the engine's octane requirements increase significantly, causing detonation. This leads to more component (valves, pistons, cylinder walls and spark plugs) overheating, which incites preignition and may yield costly engine damage.

When channeled into the combustion chamber, inert exhaust gases simply occupy space and absorb heat, thus lowering peak temperatures and reducing oxides of nitrogen (NOx), an element of photochemical smog. By controlling NOx and other exhaust pollutants, engines do lose a little fuel economy and performance, but the EGR minimizes these tradeoffs since it is regulated by vacuum.

Change the coolant annually and check the level monthly.

For example, at idle when combustion temperatures and fuel consumption are low, the EGR is not allowed to dilute the fuel mixture. When the demand or load on the engine is high or the throttle is wide open, the EGR is again not allowed to dilute the fuel/air charge.

The spark plug tip temperatures have increased 25 percent from 1973 to 1981. Disconnecting the EGR usually creates another 15 percent jump in tip temperatures. This 15 percent jump alone may be sufficient to cause engine damage. Throw in the chances of incorrect timing, increases in air temperatures, combustion chamber deposits, trailer towing or steep grades and guess what reaction an engine might have.

The EGR is located on the intake manifold or at the base of the carburetor. It can be readily identified on many vehicles because of its exposed vacuum fitting and a nearby hose which rests unused with a golf tee, bolt or ball bearing inserted in its

continued

CAUSES OF DETONATION

- **Gasoline octane rating too low** ■ **Ignition timing advanced too far**
- **Lean air/fuel mixture** Poor carburetion Intake manifold leaks Fuel lines clogged or faulty Fuel filter clogged or faulty Fuel pump clogged or faulty
- **Excessive intake manifold temperatures** ■ **Lugging engine**
- **Compression ratio increase** Combustion chamber deposits Engine modifications
- **Faulty ignition system** ■ **Spark plugs loose, cracked or defective**
- **EGR valve malfunction or inoperative** ■ **PCV system inoperative or malfunction**
- **Vacuum leaks** ■ **Valves leaking, sticking or broken**
- **Distributor centrifugal or vacuum advance malfunction**

CAUSES OF PREIGNITION

- **Incorrect type of gasoline** (octane rating too low) ■ **Combustion chamber deposits**
- **Hot spots in combustion chamber because of poor engine heat control**
- **Piston scuffing because of inadequate lubrication or improper engine part clearance**
- **Detonation or conditions causing detonation**
- **Cross firing (electrical induction between spark plug wires)**
- **Spark plug heat range too high** ■ **Head gasket protruding into combustion chamber**
- **Thin valve edges** ■ **Incorrect ignition timing** ■ **Burned valves** ■ **Engine overheating**

the backyard mechanic

continued

end. Worse, many people pull the hose off and don't plug it, so the engine has a vacuum leak, too!

While you may think that you can live without the EGR system, your engine probably won't.

Retard trigger. Because many new cars are already tuned to the max, they have a knock sensor. This device triggers an automatic ignition timing retardation when it feels a knock. Since turbo-charged engines are especially prone to knock, you'll find knock sensors threaded into the in-take manifold on all GM turbocharged engines. Ford uses a sensor that responds to boost pressure.

TURBOCHARGED ENGINE DETONATION CAUSES

- Malfunction in spark advance or retard system
- EGR system defective
- Carburetor or turbocharger air inlet restrictions
  Dirty air cleaner
  Inoperative thermal door
  Blocked air door housing
- Actuator allowing too much boost
  Check linkage
  Check hoses
  Defective wastegate
- Defect in carburetor power system
  Check vacuum
- Internal turbocharger defect

To test these knock sensors, rap the manifold rapidly next to the sensor (1,200 rpm minimum on Ford and Chrysler, 1,800 rpm on GM). The engine speed should drop as the timing is retarded. Most people can hear the rpm fall off but, if you have a "tin" ear, check it on a tachometer.

Bottom Line. In almost all cases, detonation can be completely eliminated by:

- **Using the proper** octane-rated fuel;
- **Regular maintenance** schedules including a proper tuneup with particular attention to ignition timing;
- **Using the correct** heat range spark plug;
- **Using a suitable** grade oil; and
- **Keeping** the cooling system in good working order.

driving into spring

continued from page 5

Spinning your wheels doesn't really help you gain traction anyway. Best results are obtained by gently rocking the vehicle back and forth. Repeatedly shift the gear lever from drive to reverse on automatics, or reverse to second on manuals, while applying moderate pressure to the accelerator.

The safest way to get the car out is to call a tow truck. But if you can't do that, then dig out the mud from in front and back of all tires. Remove rocks and stones trapped under the tread or touching the tires. Try to form a gentle slope in front and back of all wheels. Carefully spread sand, cinders or "kitty litter" in front of the rear wheels (front wheels if front-wheel drive) and in the anticipated path of travel. Make sure no one is standing or pushing directly behind the rear wheels where he could be hit by flying debris.

The Tire Industry Safety Council cautions not to use wooden boards, loose chains or other large objects under the wheels on the drive axle. They can fly out and whack you a good one. Blankets might seem a good idea but they provide little traction and often wrap around the axle.

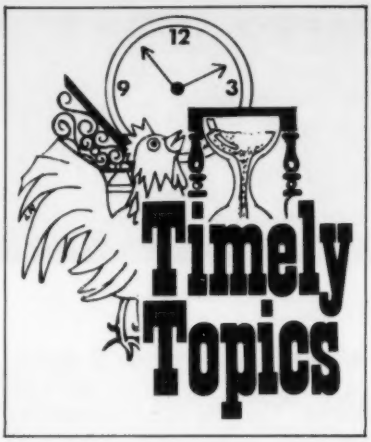
One more discouraging word: America's network of highways, roads, streets and bridges is the finest in the world. But no road or bridge lasts forever. The Highway Users Federation now estimates that 26,000 miles of interstate highways are in need of upgrading to meet current safety and service requirements. And there are growing deficiencies on our other roads as well. There are about 61,500 bridges on the federal-aid system that are structurally deficient because of the deterioration of components, such as steel beams, wood, steel, or concrete decks, and piers or abutments, or that are functionally obsolete, which means the deck width, vertical clearance or approach roadway alignment is not safe for the traffic using the bridge. There are another 161,000 state and local bridges in the same bad shape.

Most of us use the same routes every day, to work or shopping or the gym or the fast-food place. When you get in your car today to drive a familiar route, take a good look at the condition of the streets and roads you're using. Sure you know where the left turn lanes are, but is the paint so worn off that a stranger couldn't see them in a light drizzle? Are you using a four-lane road that has a two-lane bridge? Look for spots where other drivers can combine with poor conditions to get you into trouble. If you find such spots, think about a new route. If you can't change the route, then approach these spots as if every other car were being operated by your 13-year-old sister. That's the thing about this traffic safety business: The only person who is always looking out for you is you.

The light from your headlamps isn't much, but sometimes it's all you've got.

Things are looking up: We set out here to convince you that summer may be coming but there's still some unpleasant driving ahead of us. Still, nothing spring has to offer can be as bad as this past winter was all over the U.S. Before we all drive off into spring and summer, we want to add just one more thing:

Chances are your car is getting along in years. The average auto on the road today is almost seven years old. That older car can give you many more miles of dependable service IF it is maintained and repaired regularly. Sure, money is tight now. But if your car dies before its full life expectancy is reached, you lose.



AIR BAG TAX PLAN

Senator John C. Danforth has come up with an innovative approach to motivate auto makers to install air bags in cars. The Missouri Republican, who is chairman of the Senate Commerce, Science and Transportation Committee Subcommittee on Surface Transportation, has introduced legislation which allows manufacturers to claim a refundable tax credit of $300 for each 1984 and later model year car equipped with air bags. Beginning with 1984 cars, the amendment to the Internal Revenue Code also would impose an excise tax of $300 for each car manufactured without an air bag.

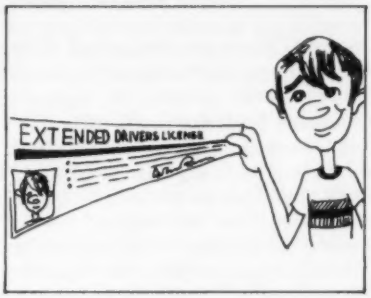
Danforth developed the tax scheme after acknowledging that his earlier bill, which would have reversed the rescission of the passive restraint standard by the National Highway Traffic Safety Administration, was doomed to failure. "Absent the support of the Administration, the legislation had little chance of being signed into law," he admitted.

Danforth believes that the tax plan meets the two major objections to the passive restraint rule. Neither the auto industry nor the consumer who might resist buying a new car for more money would bear the cost of the restraints. The federal government initially would absorb the costs, Danforth said, but ultimately air bags would create a net savings of over a billion dollars a year. According to NHTSA's own information, the government absorbs over $6 billion in accident, injury and fatality costs every year through social security, medicare, medicaid, aid to families with dependent children, disability insurance, and lost corporate and personal income taxes. These amounts are expected to increase, Danforth says, as the fatality count climbs from 53,000 deaths per year to 70,000 per year by 1990. *(Highway & Vehicle Safety Report)*

SIRENS AND THE RIGHT-OF-WAY

Road & Track reports that fire engines in Denver are being equipped with devices that automatically turn traffic lights green as they are approached. Strobe lights mounted on the trucks reach out for up to a mile and react with coded light sensors at traffic-lighted intersections.

This could be an important safety advance since a motorist in a closed car with the radio playing often cannot hear a siren in time to move to the side of the road or to stop at an intersection where he appears to have the right-of-way.



DRIVER'S LICENSE EXTENSIONS

Not all states automatically extend driver's license expiration dates for active-duty service members.

Certain states require renewal in person or by mail. These states are: Alabama, Alaska, Connecticut, Delaware, Florida, Georgia, Hawaii, Idaho, Kansas, Kentucky, Louisiana, Michigan, Mississippi, Missouri, Nevada, New Hampshire, New Mexico, North Carolina, Oklahoma, Oregon, South Carolina and Wisconsin. The District of Columbia also requires in-person or by-mail renewal.

However, many states do grant automatic extensions for people on active duty and for a number of days after discharge. The states and their grace periods are: Arizona, 90 days; California, 30 days; Colorado, 90 days; Iowa, 180 days; Maryland, 30 days; Massachusetts, 60 days; Minnesota, 90 days; Montana, 30 days; Nebraska, 60 days; New York, 180 days; New Jersey, 90 days; North Dakota, 30 days; Ohio, 180 days; Pennsylvania, 45 days; South Dakota, 30 days; Tennessee, 60 days; Texas, 90 days; Utah, 90 days; Washington, 90 days; West Virginia, 180 days; Vermont, 30 days or four years after the original expiration date — whichever comes first; Indiana, 30 days or the first four years — whichever comes first; and Virginia, which extends licenses for four years after the original expiration date or upon return to the state.

Some states issue extensions upon application: Arkansas — for the first tour of duty only, Illinois, Maine, Rhode Island and Wyoming.

Iowa is the only state that extends dependents' driver's license expiration dates. The extensions may be obtained for up to five years. *(AFNS)*

INSURANCE COMPANY OFFERS ASSISTANCE IN SAFETY SEAT PROGRAMS

The Government Employees Insurance Company, which recently instituted a campaign to provide free taxi rides for drinking employees, has started another program loaning car safety seats to employees with infants. The company hopes that its Safe Rider Program will encourage other employers to begin similar programs.

The GEICO program is open to all company employees who are parents of infants or about to become parents. Safety seats are loaned by the company and employees receive instructions on their use.

Proper use of safety seats could greatly reduce the number of deaths and injuries among children, according to GEICO president William B. Snyder. Yet very few companies are offering loan programs to their employees. Snyder reported that other companies are beginning to express interest in the program. "We are encouraging and assisting other companies to set up child restraint loan programs," he said.

Several Air Force bases have programs to lend infant seats to new parents. If you want to start a program, see "Buckle-Up Babes" in the August 1981 DRIVER. The article tells how it works at Grissom AFB, Ind.

BACKFIRE

LETTERS to the EDITOR

BICYCLES ON HIGHWAYS

I am presently stationed on a ship out of Norfolk, Va., which regularly gets your magazine. I must say that I do enjoy reading it. But recently I read a letter in the "Letters to the Editor" section that just burned me up. I felt I had to write to let you know my feelings on the matter.

In your September 1981 issue there was a letter concerning bicycles on the highways, and as the person writing it said, bicycles *do* have as much right on the road, LEGALLY. However, I can't say I share his thoughts that they have more right to be there than a car.

First off, bicycles slow the speed of traffic, especially on busy highways. This is quite dangerous to the bicycle rider as well as the driver of a car. To get around the "obstacle" he must pass just as he would a motorcycle. If the bicycle is doing 25 or 30 mph in a 45 mph zone (very hypothetical) on a busy street, look out.

Second, most roads are paid for by taxes on gasoline. Tell me what money bicycles put into highway building and maintenance? Now, if there were a clearly marked bicycle lane, as in many cities, I could understand. But not the road!

Third, what about a 10-year-old on a bicycle? Are you going to let him out there? We all laugh at the phrase "Go play in the road" but that's about what you're saying. If bicycles are so much better than cars, why are they banned on interstate highways?

And last of all, I ask you and your readers, how many times have you had to be behind a person on a bicycle with no chance to pass? Frustrating, isn't it? I don't know about you, but I'm about tired of these occurrences.

Thank you for your time, and again, thank you for your magazine. There are plenty of good articles and I learn a lot of things from them I often took for granted.

MM3 Edward D. Kelly, Jr, USN
FPO New York 09578

So far as taxes are concerned, think how many property owners pay tax to support public schools but have no children in school. Roads, like schools, are for the good of society as a whole. The Interstate System was built with federal money. Bicyclists can't use the Interstates because those highways are a dangerous environment for them, not because bicyclists don't pay federal taxes.

CUSTOM-BUILT BIKE

Thanks for your July 1981 bicycle article. You put out a lot of good information. Perhaps it will encourage even more bicycle commuters to give it a try.

Bicycle maintenance is relatively simple, but you have to know what you're doing. I do quite a bit of bike repair for folks here on base. Many who buy 10-speeds just don't know what goes where and how to get it apart and back together. For example, changing a rear wheel. The derailleur stays on the bike and the wheel comes off. I've had people disassemble their derailleur, remove the derailleur from the bike, break the chain — any number of odd things. Also, many twisted-off bolts from too much torque for the job. A bike maintenance column, with questions from readers answered, like your Double Tech for cars and motorcycles would be good, or just open up Double Tech to bike problems, too.

I've found a better solution to the wind problem here than an assist motor: an assist rider. The power of two, with the wind drag of only one rider and bike. My bike is custom built (by me) from two Schwinn frames. The rear rider has steering capability — something you don't get on factory-made tandems at any price any more. The idea came from a picture of a factory-built tandem back in the '30s. The realization came with some metalwork and three frames — two complete bikes to blend, and a third to sacrifice for tubing to couple the first two. My brother in Los Angeles has built two of these. The second one takes apart in the middle for transportation in a Toyota Tercel hatchback — something you absolutely can't do with any other tandem. It rides beautifully, too.

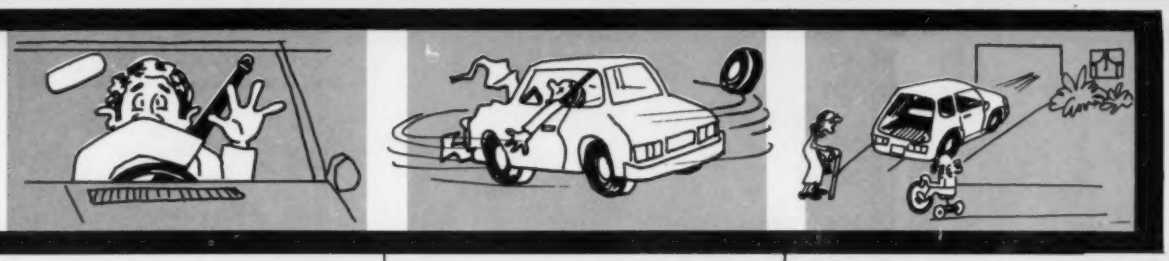
By the way, TSgt Ervan and I were both out running errands from our office — bike pooling and getting some healthy exercise. It was uphill, into the wind getting back. The bike has three brakes — front and rear calipers controlled from the front bars, and a rear drum brake controlled from the rear bars. The shifter is on the rear handlebar stem, so either rider can reach it. The bike can be safely ridden solo from either seat, though uphill stretches are best tackled from the front — the rear position has shorter cranks for better ground clearance. Likewise, the rear position is great for downhill and downwind runs — short cranks make it fun to really spin up, just like a short-stroke car engine.

Ride safely and have fun!

SSgt Frederick H. Wagner IV, USAF
Edwards AFB, CA 93523

ACTIVATED SEATBELT

I am now a believer in seatbelts after coming close to possible major injury in a traffic accident I was involved in recently.



I was driving toward a Christmas Eve church service at the Navy base about 25 miles from my home. The weather conditions were good, and I had not been drinking but had taken a decongestant for a cold I had at the time. I was driving the speed limit (50 mph) and went to sleep at the wheel, evidently due to the slight effects of the medication. I plowed into the back of a large tank truck that was doing about 25 mph traveling in the same direction (I did not cross the center line). The front of my car was badly damaged, and upon impact I was thrown forward and my head hit the windshield.

My car was built in the 1974 model year and was equipped with the active seatbelt interlock system and the system had not been disconnected by the former owner. As a result I had the belt on, and the belt kept me from being thrown through the windshield. I walked away from the accident, my only injuries being soreness at my waist (where the belt caught me), across my upper abdomen (where I hit the steering wheel), and my head and neck (a combination whiplash/impact compression injury from hitting the windshield).

I still hate seatbelts because they are uncomfortable, and my new car does not require the belts to be fastened before starting, but when I am going more than just a couple of miles I fasten the belts, especially when on a highway.

SP4 G. Mark Caldwell, USA
Santa Paula, CA 93060

Good for you. We all should get in the habit of fastening those belts even when going just a couple of miles from home. That's where most accidents happen!

USE YOUR BRAKES

I read the November 1981 issue of DRIVER and noticed a comment in TSgt Lathrop's "Double Tech" article on whether one should engage the parking brake in a standard transmission car. Let me relate an experience which happened to my wife several years ago. I believe it brings home the message.

My wife drove our 1972 standard transmission Pinto into our flat (or so I thought) garage, got out, closed the car door and went into the house. She had not engaged the parking brake but had put the car in first gear. When she came back to the garage in about one minute, the car was gone. It had rolled out of the garage, down the driveway, across the street, and was resting against a neighbor's house. It had narrowly missed a parked car and motorcycle, several small children, and an old lady. Thankfully, only the car was injured (to the tune of about $300) but it was a lesson well learned. We have never left a car parked without engaging the parking brake since, no matter how long we were going to be out or how flat the parking area is.

By the way, when I got into the Pinto to drive it off, it was still in gear.

Maj James D. Glenn, USAF
Omaha, NE 68123

Good advice we should all heed.

MANDATORY SEATBELTS AND TURN SIGNALS

First, I always use seatbelts and have been doing so since late 1952 when I installed three-point belts in the front seat of a 1951 Buick and lap belts in the rear. In fact I don't feel comfortable in a car without being belted in.

If a twit like Claybrook could decree that all cars would have to have airbags by a certain time and at a horrendous cost to the public, there should be no reason why Congress can't pass a law making seatbelt use mandatory. The government makes all kinds of rules about the cars people drive, lights, speed, kind of gas to use, etc., etc., why not a seatbelt law? A seatbelt makes much more sense than an airbag; it holds you in place and continues to do so no matter how much your car might spin, roll and impact in a really bad accident. The airbag would inflate at the initial impact and immediately deflate to let you rattle around in the car like a pea in a gourd if the car spun, rolled or impacted again. It is good only for a head-on crash where the vehicle stops on the spot.

I think the Germans and the German Insurance companies have the right idea. If you are injured in an accident not wearing a belt you were asking for it and are guilty of negligence.

New subject. Why do U.S.-built cars have their front turn signal lights on when the headlights are on? It doesn't make sense to me or did NHTSA figure the drivers wouldn't know which end of the car went first without them. I much prefer the European system of turn signals, you can't miss them or mistake them front or rear.

CW03 C.E. Gronborg, USAF
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The U.S. rule on turn signals being illuminated when headlights are on is meant to assist on-coming traffic in defining the total space a vehicle is occupying. And you're right about the value of seat belts during the "second collision."

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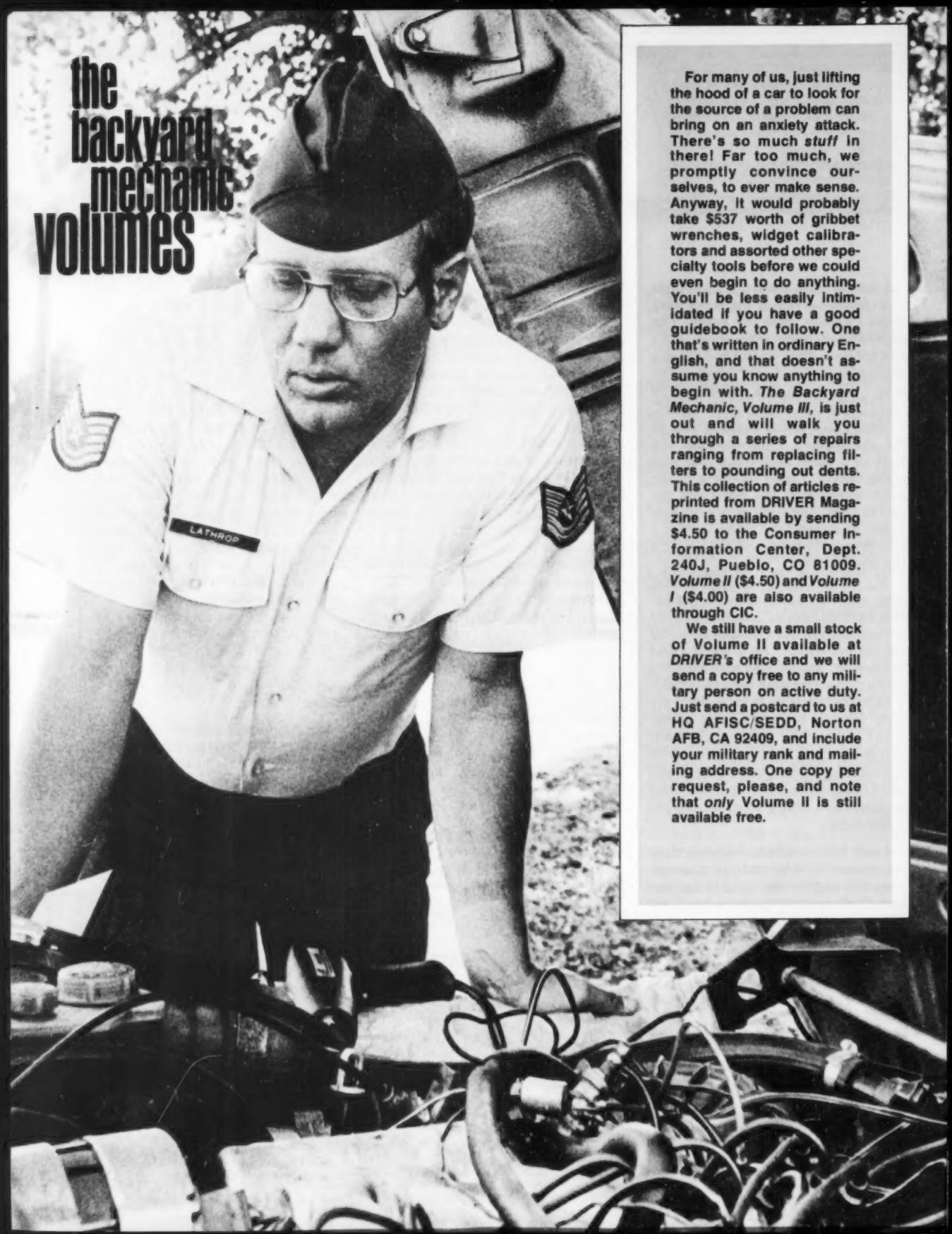

For many of us, just lifting the hood of a car to look for the source of a problem can bring on an anxiety attack. There's so much *stuff* in there! Far too much, we promptly convince ourselves, to ever make sense. Anyway, it would probably take $537 worth of gribbet wrenches, widget calibrators and assorted other specialty tools before we could even begin to do anything. You'll be less easily intimidated if you have a good guidebook to follow. One that's written in ordinary English, and that doesn't assume you know anything to begin with. *The Backyard Mechanic, Volume III,* is just out and will walk you through a series of repairs ranging from replacing filters to pounding out dents. This collection of articles reprinted from DRIVER Magazine is available by sending $4.50 to the Consumer Information Center, Dept. 240J, Pueblo, CO 81009. *Volume II* ($4.50) and *Volume I* ($4.00) are also available through CIC.

We still have a small stock of Volume II available at *DRIVER*'s office and we will send a copy free to any military person on active duty. Just send a postcard to us at HQ AFISC/SEDD, Norton AFB, CA 92409, and include your military rank and mailing address. One copy per request, please, and note that *only* Volume II is still available free.